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Low-Frequency Pulse Width Modulation Method for the Control of LEDs Illuminance with LabVIEW

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Abstrat

The aim of this paper is to determine the appropriate approach to generate lowfrequency pulse width modulation (PWM) signal by using LabVIEW. Later, the generated PWM was applied to control 40W LED driver circuits. Subsequently, the relationship between duty cycle of the signal and the irradiance of the high power LEDs was determined. The software was able to generate the PWM signal and it was connected to LEDs driver circuit by using the analog output port of a DAQ-6008. The buck converter was used to drive the LEDs. The results found that the simulated signal VI from LabVIEW was the most suitable approach in order to generate the PWM signal. The software receives two commands which were the signal frequency and the duty cycle. The findings indicated that the irradiance and power consumed from high power LEDs related to each other linearly. This method is appropriate to be applied with the LED dimming system. Although the measurements of the duty cycle from the interface hardware was between 15 to 86 percent, this idea is still very useful and can be applied to control the illuminance of the high power LEDs array, for example, a LED-based solar simulator for solar cell application or LEDs for cultivation.

Keywords: Simulate signal VI, LabVIEW, PWM, irradiance

Main Conference Topic:

Engineering

Introduction

Nowadays, white light-emitting diode (LED) is wildly used for general lighting application purposes because of its long lifetime, energy saving efficiency, high reliability, easiness of control, and less environmental impact, [1] [2] LED emits light by applying the forward bias to the anode and cathode terminal. The brightness of an LED can be adjustable by controlling the driving current that passes through the p-n junction of the LED. [1] In order to achieve constant illuminance, the flux is needed to control the forward current of the LED. Usually, the LED power drives circuit was applied to control the high-power LED. These circuits will have the current control mode, which will be appropriate for LED brightness control.

Mostly, the power drive circuit is a DC to DC converter which includes Buck, Boost, or



Buck-Boost converters. The major equipment of the DC to DC converter is the power electronics switch, such as BJT, MOSFET and IGBT. The power electronics switch used for controlling the power of the load works with the principle of an on-off control with the differences in switching frequency.

One of the most popular techniques that are used for generating the control signal is pulse width modulation (PWM). [4] [5] [6] [7] [8] [9] [10] [12] The PWM signal that was used in this paper is of a constant frequency (f) and with an adjustable pulse width (PW). The PWM signal could be generated by several methods and analog hardware. For example, the operational amplifier comparison between the triangle wave and the DC control voltage could be used to shape the analog PWM from low frequencies (Hz) until high frequencies (MHz). Therefore, the DC converters with PWM control can be applied to control the brightness of the LEDs. [3] [7] [8] [9] [10] In addition to this method, the digital hardware could be applied to generate the PWM signal, for instance, the PICI8F252 micro-controller was adapted to create PWM for controlling the brightness of the LED street light. [11] The Adriano micro- controller and the FPGA were applied in the same way. [12] [17]

In this paper, the authors focusing our study on the LabVIEW based low-frequency PWM for controlling the luminance of the high-power LED. The objectives of this research are (1) to find out the appropriate method to generate the PWM signal from LabVIEW to control the 40W LED driver circuit. (2) To investigate the relationship between the duty cycle (%) of signal and the luminance of the LED's light. The knowledge from this study will be applied to control the irradiance of the LED-based solar simulator in the next step.

Materials and Methods. Pulse width modulation.

The pulse width modulation is a modulation technique used to encode a message to a pulsating signal. The technique will be used for changing how long a square wave stay "on" and used for controlling the switching devices of the power circuits. The PWM technique could be applied to control the speed of the motor or the dimming of the LEDs. The pulse width is the time that the square wave stays "on". The duty cycle is the proportion of the pulse width and the pulse period (TP). (Equation 1) The duty cycle is adjustable by changing the pulse width and keeping the pulse period constant. The PWM signal in different duty cycles are as show in Figure 1.



Figure 1: pulse width modulation Figure 2: Design Concept for the Generation of PWM Signal.

The design of the PWM signal by LabVIEW is as shown in Figure 2. The PWM block

diagram, which can be simulated by signal V1, is shown in the red dot frame. The PWM signal is transmitted to the data acquisition device (DAQ NI-6008) for interfacing with the LED driver circuit. (Figure 2)

Software development

The author used LabVIEW 2013 for developing the low frequency PWM signal generating program. The frequency was setup at 120 Hz. The block diagram of the VIs and front panel are as shown in Figure 3.

- 1. Simulate signal VI is used for creating the PWM signal at amplitude 2.5V/ offset 2.5V/ Time > samples per second 720/number of sample = 1
- 2. Frequency is used for entering the frequency input to the simulate signal VI.
- 3. Duty cycle control (%) is used for adjusting the duty cycle to simulate the signal VI.
- 4. Duty cycle indicator.
- 5. Green indicator will be green if duty cycle > 0
- 6. Ware form chart displays the PWM wave form.

7. DAQ assistance transmits the PWM signal from simulated signal VI to analog output port of DAQ USG-6008. Set up => generating mode 1 sample (on demand)/ terminal config RES/Voltage/Output min 0/max 5V/ Output port Ao0

8. Stop the program.



Figure 3: Front panel and block diagram of the program.

This program needs two major commands which are for the frequency and the duty cycle. The limitation of this study is that we cannot enter the input frequency of more than 200 Hz because this value is the limit of the data acquisition device (USB-6008).

High-Power LED Driver Circuit.

The back converter was used as the LED driver circuit for this study. The high-power LED driver circuit is as shown in Figure 4. The L_1 and C_2 in this circuit was calculated by using equations (2) (3) and (4). [15] The author defined $I_L = 1.66A$, LED power 40 W. $\Delta_f = 0.1 I_L$, $\Delta_v = 0.6 V$, $f_s = 120$ Hz, $V_s = 24.5 V$ and $V_o = 24.0 V$

$$D = \frac{V_0}{V_S} \tag{2}$$

$$L_1 = \frac{(V_S - V_O)DT_S}{\sum_{T_o = \Delta_i} \Delta_i}$$
(3)

$$C_2 = \frac{T_S \,\Delta_i}{8 \,\Delta_V} \tag{4}$$



Figure 4: The 40W LED driver circuit.



Figure 5: Experimental setup

Experimental Equipment

The equipment that were used for this research includes (1)High-power LED 10W/12V, number = 4, warm-white, CCT 3000-3500, 900 lx, dimension(mm) 27x18x3 connected in 2 series and 2 in parallel, (2) Solar power meter model TES 133R, (3) Multi-meter Kyoritsu-

1009, (4) DAQ NI-USB 6008, (5) LED driver board with IRF520-power MOSFET, (6) 60

MHz digital storage oscilloscope, (7) DC Power Supply 30V 3A (adjustable)

Experimental Method

1. Testing the PWM signal from the LabVIEW program.

(a) Generate the PWM signal by running the program that was developed by LabVIEW.

- (b) Setup frequency of signal is about 120 Hz constant.
- (c) The author measured the PWM signal at the terminal Ao0 and GND (Figure 4) of the DAQ NI-6008 by using the oscilloscope.

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(d) Adjust the duty cycle between 0 to 100% to find out the maximum and minimum value of the duty cycle for actual usage.

(e) Calculate the percentage error (equation 5) of the frequency and amplitude of the PMW signal. [16]

$$Percentage\ error = \frac{Measured\ value - Actual\ value}{Actual\ value} (100\%) \tag{5}$$



2. Investigating the relationship between the irradiance of the light from the LED and the duty cycle of the PWM signal. The authors followed this flowchart. (Figure 6)

Results

The generated PWM signal from LabVIEW

The result found that the PWM signal at the frequency of 120 Hz could adjust the duty cycle between 15 % to 86%. The output frequency shifted from 112.2 Hz to 114.2 Hz. The error of the generating frequency is between 4.8 to 6.5%. The amplitude of the PWM signal is from 4.48V to 4.56V. The error of the signal amplitude from the setup value is between 8.8 to 10.4%

The PWM waveform at duty cycle 15%,50% and 86% are as shown in Figure 7. If the duty cycle was set up to be less than 15% or more than 86%, the output signal will be asymmetrical which could result in unstable PWM control signal. (Figure8)

Figure 6: Experimental flowchart



Figure 7: PWM signal that generate from LabVIEW with DAQ USB-6008





Figure 8: PWM signal are unstable when D=96% and 12%

Moreover, if the frequency is adjusted from 10 Hz to 200 Hz, the measurement frequency of the PWM signal at 200 Hz will result in more error than at lower frequencies.(Figure 9) In addition to that, the range of the duty cycle will decrease if the signal frequency is increase and close to 200 Hz.(Figure 10)



Figure 9: Setup frequency VS measured frequency. frequency.



Relationship between irradiance and LED's power VS duty cycle.

When the duty cycle increases, the irradiance of the light from high-power LED also increases linearly. At the maximum duty cycle (100%), the irradiance is equal to 928.1W/m^2 (Fig.11.). The irradiance of the LED is a linear function of the duty cycle. (The solar power meter measures at the distance of 8 cm from the high-power LED.) This experiment shows that the power of the high-power LED is a linear function of the duty cycle. (Figure 11) The maximum power of the high-power LED is about 33.10W at 928.1 W/m² of irradiance. This means that the irradiance per watt is about 28 W/m².



Figure 11: Relationship of measured irradiance, measured power of LED and the duty cycle



Discussion

Based on the results (Figure 11), when the duty cycle is increased from 0 to 70%, the power of the LED also increased linearly with the slope of approximately 1. Moreover, the irradiance of the LED was linearly proportional to the duty cycle as well. After increasing the duty cycle to more than 70%, the power became a non-linear curve with minimal impact on the irradiance. This is because the energy loss at the p-n junction of the LED will be more when the current is high and the thermal resistance of LED and the heat sink is increased. At this point when the duty cycle is 70%, the temperature at the high-power LED increased to about 53.3 (by measurement). The results is in accordance with the study of Bin-Juine

Huang et al.[11] They found that the constant current driving a 150 W LED causes an illumination decrease of about 12% at the temperature rise of 40 °C. This showed that if we have to control the illuminance of the LED linearly with the duty cycle of PWM, we would need to decrease the temperature of the LED while operating. This can be done by applying the heat sink with ventilating fan or adding the liquid cooling system or by using the thermo- electric cooling device.[18] [19] Moreover, the high-power LEDs lifetime will be extended based on the temperature corrections.[20] [21]

Conclusion

The method of signal VI simulation in LabVIEW is confirmed to be a possible alternative method of generating the low-frequency PWM signals. The simulated signal VI is adjustable with a more precise duty cycle than the analog hardware. This method was easy and appropriate for a friendly user-interface. This idea can be applied for usage in controlling the irradiance of the high-power LED. It is also convenient to interface PWM signal from the DAQ device to control the power electronics switch of a Buck converter. The irradiance of high-power LED is a linearly function of the duty cycle of the PWM signal.

This method offers beneficial controls for a vast number of the high-power LEDs. For instance, such beneficial controls include the dimming of solar simulator for solar cell testing or for the controlling of the LED system for cultivation.

The future research the authors have to improve upon is with regards to the linearity of the duty cycle and the irradiance flux of the high-power LED.

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THE STUDY OF HARMFUL SUBSTANCES IN THE COMBUSTION CHAMBER BKZ-420 CHP

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Abstract. This article is devoted to the investigation of thermal characteristics of pulverized coal combustion process in the combustion chamber of the boiler BKZ-420. The greatest changes in the temperature distribution observed in the central part of the combustion chamber in the field of the fuel supply and the air fuel mixture are by burner holes. Carrying out the study of thermal characteristics is an important step during the modeling process of heat and mass transfer from the pulverized coal combustion, which allows to determine the temperature field throughout the volume of the combustion chamber and outlet. It has been determined the optimal combustion technology of high-energy fuel and the best structural parameters of the combustion chamber of the boiler BKZ-420 Almaty thermal power station that improve the wear resistance of power and reduce harmful emissions into the atmosphere (temperature decrease of the furnace wall, opposite the burners on the 300° C, ie 17.24% and secondary reduction of carbon monoxide concentration of CO at the outlet from the furnace at 15% carbon dioxide CO₂ - 4.65%, and nitrogen dioxide NO₂ - 14%).

Keywords: Combustion, heat and mass transfer, pulverized coal, harmful emissions.

Conference Topic: Engineering.

INTRODUCTION

As coal is a major source of energy of the XXI century, all around the world it is paid more attention to the problem of its efficient and cleaner burning. The coal share in the reserves of fossil fuels shown in the fig.1. Compared with other fossil fuels, coal resources are of approximately four times more than the oil reserves (estimated at 41) or gas reserves (67 years) [1].



1 - oil, 2 - gas, 3 - coal

Figure 1 – The world's proven reserves of fossil fuels



Global Energy Sector at present and in the foreseeable future based on the use of fossil fuels, mainly low-grade coal.Be noted that the deterioration of the quality of steam coal is widespread, and not only in the CIS countries, but also in the developed capitalist countries. To date, the world's thermal power plants (TPP) produce more than 40% of electricity and heat. Although the history had ups and downs in the activity of coal, now it remains one of the most important fuels for energy, especially electricity (Fig.2).According to statistics from 2003 [2], coal provides about 24% of the thermal energy and produces about 40% of the world's electricity.In the near future it is expected to increase its use. According to the forecasts By 2020, the share of coal in the world fuel balance will be more than 50%. Figure 3 shows the share of primary energy in the past and the future.These studies based on availability and forecast growth in demand for energy [6, 7]. Follows from the figure we can observe that the share of oil and gas in power generation by 2100 will decline, while the proportion of coal will grow.



coal, 2 - liquid fuel (fuel oil, diesel fuel), 3 - gas 4 - nuclear energy, 5 - hydropower, 6 - other (solar, wind, geothermal energy, waste, including vegetable origin).



Figure 2 - Distribution of energy for the production of electricity in the world [2]

Figure 3- Primary energy shares from 1850 to 2100 (reprinted from WCI, 2000b)

A direct burning of low-grade coal with high ash content (40-50%), humidity (30-40%), sulfur (1-3%) and low-volatile (5-15%) in the existing furnace devices involves considerable difficulties of -this deterioration of ignition and fuel burn, increasing the fur



underburning and harmful dust and gas emissions (greenhouse gases, ash, nitrogen oxides and sulfur). Suffice it to say that the problem of greenhouse gases (carbon dioxide, methane and others.) and the consequent general warming has grown now to universal problem of global climate change on the ground, flooding large areas of land, desertification and others.

Combustion of pulverized coal has the greatest environmental impact on the environment: toxic and greenhouse gases, particulate matter, waste and water filtration, slag disposal fly ash, thermal vents and much more. In addition, the development of the energy sector due to the large-scale transformation of the components of the environment, the negative effects of which may occur for a long time [3].Coal mines are changing terrain and form specific soil and ground conditions dumps, hydroelectric reservoirs cause changes in seismicity, flood the valley the most productive ecosystems are changing the landscape structure of regions.

The irreplaceable effective method of theoretical investigation of flows of chemically reacting media is numerical simulation. This approach is currently being intensively developed in many countries: build a more advanced model, constructed new numerical algorithms held a variety of computational experiments.Numerical simulation can be used to predict and study the behavior of complex physical systems. In order to give quantitatively correct predictions, the simulation should be described as separate processes operating system and their interaction. The mathematical theory of turbulence is absent so far. In recent decades, some development has been direct simulation of turbulence on large computer systems, accurate implementation of which, however, is fraught with difficult to overcome computational costs now and in the near future.

To date, there are developed variety of mathematical models for calculation of turbulent flows, turbulent combustion and heat radiation transport.Moreover, there are a lot of created powerful computational software packages (FLOREAN, Ansys Fluent and others) that implement these mathematical models. Finally, the possibility of parallel computing and fast development of high-performance computing systems can effectively perform detailed calculations on large grids. The most important issue was reliability of the results of calculations and the experimental data. Thus, the focus of this paper is focused on the ability of modern packages perform the calculation of turbulent Flames with the required accuracy [4].

To achieve this objective is invited to consider a model problem - well documented jet diffusion flame, for which there is credible and detailed measurements of fundamental physical quantities.Comparison with the results of measurements reveals turbulence and combustion models, as recommended, and completely unacceptable for this class of problems as the computing tool that is used in this work is FLOREAN [4-6]. One of the most interesting and useful from the point of practical application view are questions of modeling heat and mass transfer in the presence of physical and chemical processes in the areas of real geometry. These areas are the combustion chamber of various thermal power plants, internal combustion engines, etc.

MATHEMATICAL AND PHYSICAL FORMULATION OF THE PROBLEM

For simulation of heat and mass transfer in the presence of physical and chemical processes we used the fundamental laws of conservation of quantities such as mass, momentum, energy.Since heat and mass transfer in the presence of physical and chemical transformations is the interaction of turbulent motions and chemical processes, we must take into account the conservation of the components of the reaction mixture, turbulence, multiphase medium heat due to radiation of heated fluid and chemical reactions.

To write all equations with the above-mentioned physical and chemical phenomena that make up the mathematical model, we consider the complex processes of heat and mass

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transfer in reacting media, written in the beginning of all these equations in the general form of conservation law of some substance \emptyset (mass, momentum, energy, component of the mixture).

In differential form the continuity equation or the conservation law of mass can be written as:

$$\frac{\partial \rho}{\partial t} + \frac{\partial \rho u_i}{\partial x_i} = 0$$

$$(1)$$

The law of conservation of momentum and the momentum equation is written as follows:

$$\frac{\partial \rho u_i}{\partial x_i} + \underbrace{\frac{\partial \rho u_i u_j}{\partial x_j}}_{II} = -\frac{\partial p}{\partial x_i} + \frac{\partial \tau_{ij}}{\partial x_j} + \frac{\rho g_i}{V},$$
(2)

The change of energy in reacting turbulent flows can be caused by the following processes: the total energy flow by convection; the total energy flow through molecular heat transfer; change of energy due to the pressure forces working on the surface of the control region; energy change due to the work of friction forces on the surface of the control volume; energy change due to the work of body forces; absorption or release of energy as a result of chemical changes, or due to the energy of the thermal radiation [7].

In view of the above reasons, the energy equation in a general form can be written as:

$$\frac{\partial}{\partial t}(\rho E) + \frac{\partial}{\partial x_i} (u_i(\rho E + p)) = \frac{\partial}{\partial x_i} \left(k_{eff} \frac{\partial T}{\partial x_i} - \sum_{j'} h_{j'} J_{j'} + u_j(\tau_{ij})_{eff} \right) + S_h,$$
(3)

Where k_{eff} - effective thermal conductivity, which is determined by the sum of $k_l + k_t$ (laminar and turbulent thermal conductivity, respectively), $J_{j'}$ - diffusive flux component j'. The law of conservation for the components of the reaction mixture.

$$\frac{\partial}{\partial t} \left(\rho C_{\beta} \right) = -\frac{\partial}{\partial x_{i}} \left(\rho C_{\beta} u_{i} \right) + \frac{\partial}{\partial x_{i}} \left(\frac{\mu_{eff}}{\sigma_{\beta eff}} \frac{\partial C_{\beta}}{\partial x_{i}} \right) + S_{\beta}$$
(4)

The combustion chamber of the boiler BKZ-420, steam capacity of 420 T/h, located on the Almaty CHP-2 was selected as the object of research. The boiler E-420-13,8-560 BT (BKZ-420-140-7) designed for operation with Ekibastuz coal to produce superheated steam at thermal power plants with cogeneration turbine for high steam parameters.

In the combustion chamber provides dry ash removal [8-9]. Ash removal mechanized, using a continuous screw conveyors and crushers. Combustion chamber - prismatic, open type, with plan dimensions axes of pipes $14,46 \times 12,052 \times 29,102 \text{ (m}^3$). The furnace is shielded all-welded gas-tight evaporator walls made of pipe $\emptyset60 \times 6 \text{ mm}$ welded strip $20 \times 6 \text{ mm}$ (steel 20). Step pipes panels is 80 mm.

The combustion chamber of the boiler is equipped with six double-flow vortex pulverized coal burners arranged in two levels with three burners on the front wall of the boiler. Extremes burner turned to the center of the furnace by 8 degrees.Performance of one burner of Ekibastuz coal is 12 T/h. In the furnace of combustible dust of low-grade high-ash Ekibastuz coal with an ash content 40%, volatile 24%, humidity 5% and the highest calorific value equal 16,750 kJ/kg. Coal fineness is equal to $R_{90} = 15\%$. All numerical calculations were performed on the above methodology [10-12].



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(a) - 3D view of BK-420 boiler and its breakdown intocontrol volumes (b) - Burners establish arranged on two levels (c) – Top view on the cross section (h = 10.75m) (b) 1- hole pattern (16x60 cm)

Figure4- General View of the industrial boiler BKZ-420 of the Almaty TPP-2

RESULTS OF COMPUTER SIMULATION

On the front wall of the combustion chamber are six vortex dual-flow pulverized coal burner (Fig.4) two layers (three on stage). Extremes burner turned to the center of the furnace by 8 degrees. In Fig.4 and in the opposite side of the wall is the area of the second tier of burners which is opening for supply of additional air turned to the center at 45 degrees, and the size of which is 14x60sm.In carrying out computational experiments, the initial step is to build the geometry of the object that is under study, as well as get it finite difference grid [13-16].In addition, the used software package need to create a source files that contain physical and geometrical data of the investigated process, as well as initial and boundary conditions for modeling the heat and mass transfer in turbulent flows high.

The work is devoted to the study of the thermal characteristics of pulverized state fuels combustion process in the combustion chamber of the boiler BKZ-420. Figures 5-12 show the calculated temperature data fields. We see that the greatest changes in the distribution of temperatures observed in the central part of the combustion chamber in the supply of fuel and air fuel mixture through holes burners. Carrying out the study of thermal characteristics is an important step during the modeling process of heat and mass transfer from the pulverized coal combustion, which allows to determine the temperature field throughout the volume of the combustion chamber and outlet.

Figure 5 shows the temperature field in region of the lower belt burner at mass flow of air equal to5kg/s and 10 kg/s. For the case where the air flow through holes is 5kg/s temperature reaches the opposite wall burners at values 1740 °C and with flow rate 10 kg/s -1440 °C. This can be attributed to the large amount of additional air of low temperature (T =340 °C) supplied through the holes in the section z = 10.8m, which led to decrease in the wall temperature about 300 °C and to protect it from overheating [17].







a) 5 kg/s

b) 10 kg/s

Figure 5 - The distribution of temperature T in the combustion chamber cross-section burners in the zone of the lower layer(h = 6,82 m)

Figure 6 shows three dimensional temperature distribution in the field of two longitudinal sections (Y1=2.95 m and Y3=11.4775m) of the combustion chamber located in the outer areas of the upper and lower burner stages [18]. We see that with a flow rate of additional air that is equal to 5 kg/s Maximum temperature is observed at the wall, located opposite to the burners and 1740 °C is in the lower burners layer (Z = 6.82m). A flow of air at 10kg/s can be seen that the temperature at the wall is significantly reduced by approximately 350 °C.



Figure 6 - Three-dimensional distribution of the temperature field in the longitudinal sections Y1 = 2.95 m and Y3 = 11.4775m of the combustion chamber



Figure 7 shows the temperature distribution in the longitudinal section along the X-axis (X = 4.01m). It can be seen from the analysis that at low mass flow rate of air (5 kg/s) of counter burner flame is formed in the area between the burners (Figure 7a), while at high flow rate (10 kg/s) the temperature field (Figure 7b), as it were extends in height of the combustion chamber.



Figure 7 - The temperature field in the longitudinal section X = 4.01m for different values of the mass air flow

Figure 8 shows the temperature field at the outlet of the combustion chamber for two values of the additional air flow holes: 5kg/s and 10 kg/s. As can be seen from the figures, in the second case (Figure 8b), high-temperature region is smaller than in the first case (Figure 8a).



a) 5 kg/s

b) 10 kg/s



Figure 8 - Temperature at the outlet from the field of the combustion chamber (X = 12

m)

Since the burner and secondary air holes for disposed on opposite walls and directed toward each other at the center of the combustion chamber in the zone of contact currents, as mentioned earlier, dissected. Part of the flow goes to the cold zone of the funnel, forming two longitudinal vortex at an altitude lower than 10.8 meters, and the part formed by the thrust directed towards the exit. Further, as we move out of the combustion chamber and chemical processes are weakened (Figure 8), the temperature drops and at the outlet of its average value is about 1045 °C for flow 5kg/s (Figure 7a) and 987 °C - for consumption 10 kg/s (Figure 8b).

The foregoing is confirmed by two-dimensional graph of the temperature distribution along the height of the combustion chamber for two different mass flow of additional air through the hole shown in Figure 9. Analysis of the figure shows that at a height z1 = 6.82 and z2 = 10.8 meters located burners through which served cold aero mixture, the observed minimum in the temperature distribution. At the outlet chamber when the air mass flow rate 5 kg/s temperature higher compared with 10 kg/s feed [19].



Figure 9 - The average temperature by the height of the boiler furnace The outlet temperature of the combustion chamber confirmed it experimental value (T = 1171 °C) obtained directly on the CHP, presented in the paper and numerically. Comparing these values, we can conclude: computational experiment conducted to determine the values of the temperature in the volume of the combustion chamber, with sufficient accuracy is consistent with the measured values of temperature (Figure 9).This gives an indication of the reliability of the results and applicability of physical, mathematical and numerical model for further study of the thermal and concentration characteristics of the combustion chamber 420 BKZ Almaty CHP-2.





Figure 10 - Distribution of the concentration of carbon monoxide CO in height of the combustion chamber



Figure 11 - Distribution of the concentration of nitrogen dioxide NO_2 at the outlet of the combustion chamber (X = 12 m)

Figure 10 shows the distribution of average values of the concentrations of carbon monoxide CO by height of the combustion chamber for two different values of the additional mass flow of air through the holes located on the opposite side of the burners. We see that at both the color and three-dimensional graphs of the temperature field at the exit of the combustion chamber the air mass flow equal to 5 kg/s, the concentration of carbon monoxide CO as compared with the above case, when the flow rate is 10 kg/s [20].





Figure 12 - Graph of the average values of nitrogen dioxide NO_2 in height the combustion chamber for different values of the mass flow of additional air

At the output (Figure 11) we have mean concentration $NO_2 = 761 \text{mg/Nm}^3$ for additional air flow equal to 5 kg/s (Figure 11a), the mean value for the NO₂ concentration at the outlet section of equal 655 mg/Nm³ to flow-10 kg/s with (Figure 11b), which is quite acceptable emission standards for NO₂, adopted by the CHP.In the proposed version the coal combustion (secondary air flow rate is 10 kg/s) decreased by 14% in comparison with the first case.Thus, it can be seen that increasing the supply air flow further reduces the average concentration of nitrogen dioxide NO₂.

Figure 12 shows the comparative distribution of average values of NO_2 concentrations by the height of combustion chamber. Analyzing the picture, you can notice that as you move out of the combustion chamber concentration of nitrogen dioxide is reduced. This is primarily due to the destruction of nitrogen dioxide NO_2 in its interaction with hydrocarbons, carbon, oxygen, etc., with a decrease in temperature in the upper layers of the gas mixture and of course decrease in these areas, the nitrogen concentration of fuel and oxidizer, which is already chemically reacted in the field below burners.

CONCLUSION

The main characteristics of heat transfer in the combustion chamber, such as the temperature T, concentration of carbon oxides (CO), nitrogen dioxide (NO₂) experiencing the greatest changes in the locations of the burners, which are supplied through the fuel (coal) and oxidant (air) [21-22]. This can be explained by the fact that of the core of torch location in the burner zone which have higher temperatures, with the most intensive chemical reactions between the constituent parts of coal and the air with maximum formation of the products of these reactions (carbon and nitrogen oxides) and maximum heat release Q_{chem} .

Such a pattern of behavior characteristics of heat and mass transfer process in the combustion chamber during combustion in coal-dust flame it adequately reflects the actual process of combustion occurring in the combustion chamber coal-fired thermal power plant. The comparison of calculated values of the unknown quantities and the the experimental data obtained empirically CHP showed good qualitative agreement.

The optimal combustion technology of high-energy fuel and the best structural parameters of the combustion chamber of the boiler BKZ-420 Almaty thermal power station



that improve the wear resistance of power and reduce harmful emissions into the atmosphere (temperature decrease of the furnace wall, opposite the burners on the 300° C, ie 17.24% and secondary reduction of carbon monoxide concentration of CO at the outlet from the furnace at 15% and nitrogen dioxide NO₂ - 14%) are obtained in present work.

In this connection it can be argued that started in the thesis of physical and mathematical, chemical and geometrical models of combustion coal-dust flame in the combustion chamber correctly reflect the aerodynamic flow and processes occurring in it heat and mass transfer. The results obtained by 3-D modeling of the processes that occur during combustion of solid fuel in the combustion chamber of real CHP (the boiler BKZ-420 Almaty CHP-2) allow the development of new technical solutions for the most efficient and "clean" energy production, both in existing power plants and the creation of new flue boilers.

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A study on location correction method of 3D BIM-GIS models for effective data connection

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Abstract

As the demand on three-dimensional (3D) spatial information has increased in South Korea, 3D spatial information services have been provided by the Ministry of Land, Infrastructure and Transport, Seoul City, Daum Kakao and other local governments and related companies. In the mapbased 3D spatial services, location correction is an important factor that determines the applicability of specific task. Since existing building information modeling (BIM) data consists of relative coordinate values, it has been difficult to be interlinked with Geography Information Modeling (GIS) data which have absolute coordinates. Therefore, this study proposes a location correction method for indoor and outdoor 3D spatial information through the construction of BIM/GIS platform-based modeling data. To do this, a target of the platform testbed was selected and a process of data construction was conducted using three steps to identify a mismatch between the BIM model that deals with indoor spatial information and an orthophoto-based textured 3D model for realistic visualization thereby designing a location correction algorithm. An algorithm that converts relative coordinates into absolute coordinates was implemented to interlink the BIM model data based on relative coordinates and texturing data based on absolute coordinates for a single building to calculate the absolute location of the building first. Then, a second mapping of texturing data over the BIM/GIS platform map was conducted to correct the final location in the 3D model data.

Keywords: Building Information Modeling (BIM), Geography Information System (GIS), 3D modeling, Unmanned Aerial Vehicle (UAV), Location correction

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Introduction

As the demand for three-dimensional (3D) spatial information has increased in South Korea, 3D spatial information services have been provided by the Ministry of Land, Infrastructure and Transport, Seoul City, Google, Microsoft and other local governments and related companies [1]-[4]. These map-based 3D spatial information services help users to have an intuitive understanding through effective 3D visualization and realistic virtual experience as if the users were actually in that place.

Currently, the Korea Institute of Civil engineering and Building Technology (KICT) interlinks a Building Information Modeling (BIM) that deals with object-based indoor spatial information and a Geographic Information System (GIS) that deals with regional based outdoor spatial information to implement a BIM/GIS inter-operable open-type platform [5]. In the process, BIM data, which have relative location information, are required to be converted into absolute coordinate values of actual locations and mapped with the orthophoto-based textured 3D model to complete a series of location correction tasks. The location correction is an important factor that determines the applicability to specific tasks [6].

The process of this study is summarized as follows: First, a trend of national and international studies on location correction of 3D spatial information data is analyzed to derive the main implications of the study. Second, a target is selected to construct the BIM/GIS platform-based modeling data and a process of data construction is divided into three steps. Third, a linkage method of indoor and outdoor 3D spatial information is proposed along with the location correction process in order to resolve the location correction issue between the texturing model and BIM model.

Related work

Location correction, which was mentioned as one of the main issues during 3D spatial information data construction through laser scanning in existing location survey fields, has been studied to provide various methods considering data characteristics for the creation and utilization of 3D modeling in a number of GIS-related fields in recent years. In this section, trends of national and international studies on location correction of 3D spatial information data are investigated.

Park [7] proposed a method of location correction utilizing a smartphone camera and commercial digital maps in urban areas where GPS error occurs considerably. In his study, user location and directions were corrected to have location correction required for indoor and outdoor augmented reality through location optimization in three places in the downtown in Seoul. Reitmayr et al [8] utilized a tour guide application operated in the downtown in Vienna to propose an efficient matching algorithm to manage a large-amount of 3D geographic model data. Choi et al [9] conducted a study on location correction of spatial information with regard to small areas using Ground Control Points (GCPs) for



analysis on location correction of Digital Surface Model (DSM) and shooting images during aerial photographic survey utilizing u

Unmanned Aerial Vehicle (UAV). Wagner et al [10] searched feature points to compare panorama images and camera images utilizing mobile phones and conducted a study on matching with Point of Interest (POI) information based on the search with a descriptor form.

The above studies proposed solutions to ensure location correction of 3D data through laser scanning, shooting via smartphones and aerial shooting images mostly. It is important to propose a method by analyzing appropriate measures suitable for individual characteristics in order to apply a construction method for each environment according to utilization objectives and methods of 3D spatial information modeling. This study proposes a correction method to resolve location mismatch occurred during interlink of BIM data and 3D texturing data during 3D modeling data construction over the BIM/GIS platform, which is one of the various 3D modeling construction methods, thereby linking indoor and outdoor 3D spatial information.

Construction of 3D modeling data based on BIM/GIS platform

Overview of BIM/GIS data

The BIM/GIS interoperable platform provides effective visualization services utilizing 3D modeling data by operating and managing spatial information seamlessly in a single platform, which was provided separately into indoor and outdoor data previously, via linking BIM and GIS technologies [5]. A scope of this study is data construction for the testbed and BIM/GIS modeling data are created with regard to a site in the KICT.



Figure 1: Concept of BIM/GIS platform



Geographical information was constructed via DSM modeling in Ilsan Headquarters, Hwaseong, and Andong centers of the KICT, which were selected as the target region for this study, and effective visualization can be ensured through the use of aerial shooting orthographic images. This can be a basis to provide various applicable services in facility maintenance, response to fire accidents, and energy usage visualization by systematization of existing facility maintenance data and linking the data with the current modeling data in the future (Fig. 1).

Construction of BIM/GIS modeling database

The following database (DB) tasks were performed: construction of satellite/aerial images, which were the bases in the platform, an administration border between the target and surrounding sites and the verification of names, POI construction, the construction of a standard classification system, the construction of basic attribute information, and the construction of survey and real images (Fig. 2). Next, BIM modeling was conducted based on the arranged data and texture task and exterior modeling were performed for texturing according to Level of Detail (LOD). After the basic design task was completed, the main MEP modeling and structural modeling inside the facility were conducted. Then, the data verification was conducted after converting the data to the final BIM standard format, which was Industry Foundation Class (IFC). Finally, the data was converted to the internal service format for interoperability inside the BIM/GIS platform through the data conversion module, and the data was mounted in the platform.

The construction of the BIM shape and attribute information modeling based on existing building drawings was conducted as follows: For shape information, 3D BIM data was modeled based on 2D drawings and existing maintenance data of facilities inside the KICT. The modifications of existing buildings due to new construction, extension, removal, or remodeling were reflected through actual image shooting.



Figure 2: Process of BIM/GIS modeling

Figure 3: Process of building shape texturing



UAV shooting and 3D texturing data modeling

This step is a procedure of texturing of facility exteriors for a more realistic 3D visualization than the existing BIM modeling images such as Google Earth and V-World. In order to interlink the data surveyed and be shot at the target site via control survey, actual image shooting, and UAV shooting with the above BIM/GIS modeling data, shot images were edited and distorted images were processed to create a texture map and the final texture was mapped (Fig. 3).

The UAV shooting was conducted as follows: A flight area was set considering the control range of wireless reception and the maximum and minimum flight distances of UAV inside the target site, and the minimum rotation radius of the UAV and weather conditions were checked thereby expanding the flight area for the set up. After this, a map boundary of the target area was calculated as a shooting area and altitudes were verified using a digital map in Digital Elevation Model (DEM) to set up the appropriate shooting altitude and overlap. Finally, site shooting was conducted considering weather, site conditions, and electromagnetic shaded areas.

After the aforementioned shot data was collected, spatial distribution of shot images was verified based on the original shot images, and photos of overlap or unnecessary area were removed due to a difference between the map boundary area and the expanded analysis area. Geometric correction and partial correction were conducted using GCP after the first filtering completion. The areas where a large error occurred were selected and corrected partially and GCP were added between the image division boundary and correction boundary parts to minimize the effect from other regions.

Results and analysis

The modeling data constructed through the above process was uploaded into the BIM/GIS platform and visualized as shown in Fig. 4. The above 3D data included not only outdoor spatial information but also indoor spatial information and object-based shape and attribute information thereby visualizing the indoor and outdoor data in contrast with the 3D data indoor map data in Seoul City and V-World data. Accordingly, facilities inside the actual target area were shot to interlink the texturing model and BIM modeling data. Thus, realistic 3D data could be constructed and utilized.





Figure 4: (A) Real building images, (B) Result of BIM/GIS modeling

However, while the absolute coordinates in the BIM/GIS platform map was applied by utilizing control points for the 3D texturing data, the relative coordinates were utilized in general for BIM data during modeling creation. Thus, it was mandatory to have location correction to interlink BIM data with that of the texturing model over the platform. As a result, this study proposed a measure of location correction and designed a process to construct indoor and outdoor 3D spatial information through the interlink of BIM data and 3D texturing data.

Connection of 3D indoor-outdoor spatial data

Location correction process between 3D spatial data

The location correction process for the indoor and outdoor 3D spatial information is as follows: First, IFC files, which are BIM model data, are loaded (Fig. 5). This data is exported to IFC after being processed in the Revit architecture. These are created based on relative coordinates and their own origin points and arranged arbitrarily near actual building locations by users.

After this, a coordinate conversion algorithm based on IFC data is created thereby being converted and mapped to absolute coordinates that are corresponded to actual locations as follows (Fig. 6). A process of the IFC data-based coordinate conversion algorithm is as follows: Once the IFC file is loaded, the detailed precision and control points as well as volume information set in the IFC are verified. Here, longitude, latitude, rotation angle, and size information are modified by performing a coordinate correction of origin point if the control point needs to be changed. The modified control point information is



updated through updateHeader in the BIM/GIS data schema structure, and BoundingBox and OctreeBox, which are related to detailed precision and 3D model visualization, are calculated automatically based on the set coordinate values. Finally, coordinate automatic conversion is performed based on the data in the coordinate setup window.



Figure 5: BIM(IFC) data load

Figure 6: Coordinates translation algorithm

Next, once the DB index information and LOD levels are entered as shown in Fig. 7, and the reference position value (relative control point) inside the IFC is entered, the absolute coordinate information of the buildings is automatically calculated to be re-adjusted to the actual location very closely. Finally, a detailed location of the IFC data is manually corrected to be accurate using 3D texturing data uploaded based on the survey points beforehand. As shown in Fig. 8, the first location-adjusted IFC model is mapped to texturing data, which are laid on the actual location, to confirm the final location.



Figure 7: Absolute coordinate mapping to IFC data

Figure 8: Location correction between BIM/GIS data and 3D texturing data

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Application of location correction algorithm

Since the IFC data has no coordinate information of absolute longitude and latitude, they require absolute coordinate values such as longitude, latitude, and altitude in the GISbased viewer or during data inter-operation. In this study, location correction was performed through rotation, movement, expansion, and reduction of objects in the 3D space of the IFC model based on high-precision (5 cm) aerial images acquired via UAV to interlink the IFC and GIS information. Here, the high-precision aerial images acquired through UAVs are geographically coded and verified data through at least 50 or more GCP. As the IFC has no schema that stores spatial geographic references, manual operation is essential when it is interlinked with the absolute coordinate-based GIS.

	Before	After
Latitude	0	127.4243
Longitude	0	38.458222
Elevation	0	18
Heading	32 degree	96 degree
Tilt	0	0
Roll	0	0
Scale X	1	1.2
Scale Y	1	1.2
Scale Z	1	1.2

Table 1: Results of location correction algorithm

The values before and after the location correction using the location correction process are as follows: Existing IFC had only direction information since its location information was configured based on relative coordinate points. However, an error range in actual coordinate values and the sizes of buildings and vector values can be corrected to ±5cm after applying the location correction algorithm proposed in this study. The error range can be improved further if more high-precision aerial images are acquired through the UAV the current study.





Results and analysis

When 3D spatial information location correction was conducted using the above process, the following two issues were raised: 1) The Z-fighting problem between 3D texturing model and BIM model and 2) the location correction method when no survey points are available.

Z-fighting refers to a phenomenon of flicking, broken polygon and random overlap as if noise occurs when two polygons (primitive) are visualized in a screen with similar Z-depth (Fig. 9). It occurs normally when two or more polygons are overlapped in the same position over a 3D space or polygons are too close to each other. Most Z-fighting phenomena can be prevented beforehand through the adjustment of near and far distance of the screen frustum. That is, since a weight can be higher with regard to the Z-depth as the camera is nearer, a near plane value is rescaled to become far away from the camera to resolve this problem.





Figure 9: Problem issue about Z-fighting

Figure 10: Re-scaling of 3D model to solve Zfighting issue

However, a visualization area in the 3D client is quite wide in case of the BIM/GIS inter-operable platform. Thus, this problem cannot be solved only with near and far plane rescaling in order to visualize data from the earth to a narrow area in building indoor. Thus, the Z-fighting problem can be solved by making a shape size of 3D texturing modeling larger than that of the BIM by about 1 to 2% (Fig. 10).

The second issue occurs when no survey points are available. Fig. 11 shows a measure of absolute location correction for the BIM (IFC) data or 3D texturing model using high-precision aerial images when no survey points are available.





Figure 11: Location error occurrence



Figure 12: Location correction to solve the error

When the absolute location correction of two 3D models cannot be done through geographical coding as indoor and outdoor survey points are available, location correction can be done using high-precision aerial images (Fig. 12). Here, the longitude value becomes larger as it moves to the right and the latitude value becomes larger as it moves to the true north in the 3D screen.

Conclusion

This study produced and interlinked BIM (IFC) data and orthophoto-based 3D texturing data to construct BIM/GIS platform-based 3D modeling data, and proposed a location correction method to resolve a location mismatch between two models. An algorithm that converts relative coordinates into absolute coordinates was implemented to interlink the BIM model data based on relative coordinates and texturing data based on absolute coordinates for a single building to calculate an absolute location of the building first. Then, a second mapping of texturing data over the BIM/GIS platform map was conducted to correct the final location.

There have been a number of studies on location correction with regard to large regions. It is important to implement a construction method suitable for environments according to utilization objectives and methods of 3D spatial information modeling by analyzing the appropriate measure for each characteristic. For future studies, these techniques can be extended to be utilized to interlink underground facilities in the BIM/GIS platform, the development of facility maintenance systems through the interlink of indoor and outdoor spatial information, and the re-structuring of apartment complex plan.

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Effective Use of Mobile Technologies to Enhance Attainments in Programming Languages

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Abstract

The purpose of technological applications in the field of education is to increase the gain ratio of students. Although there are a lot of technological applications produced in this field, there is still room for improvement. The aim of this study is to improve the achievements of students in programming language classes. We developed a mobile system for this purpose. Course flow has become more functional with this system. The students test themselves after a course. Our proposed system also helps them to prepare for the next course. The lecturer is able to broadcasts course materials which must be studied before or after a course. The system automatically does roll calls for practices made before and after a course. The lecturer manages the course more efficiently and the students pass a more productive educational process. With the use of this mobile system, the learning period of students was shortened.

Keywords: Computer Sciences, Mobile Application, Programming Language, Educational Software

INTRODUCTION

Computer programming is a problem-solving procedure that requires the use of various skills in order to produce algorithms and codes. An effective and productive educational programming process is needed to provide these skills to students. Logical thinking, algorithm developing, code writing and analyzing are important competencies that students should gain during the teaching process.

Mobile-learning is considered to be the skills to use mobile technologies in order to support teaching and learning (Mehdipour & Zerehkafi, 2013). Students can continue to learn, regardless of time and place by using mobile devices (Crescente & Lee, 2011). Moreover, it is well known that mobile learning has a lot of advantages. The instructor can make instant broadcasts. It is synchronous and spontaneous. Communication between student and instructor is away from preventions and it is flexible (Ramnath & Kuriakose, 2015) (Naismith et al., 2004).

In this paper, we propose a mobile system for teaching programming languages. With the use of mobile technologies it is expected to make an important contribution to the acquisition of necessary skills in the programming area. By means of proposed application, the instructor is able to customize different study programs for students in line with their underachievement. At the same time, the course instructor will monitor the class quickly when it is required. Tests can be done on topics which are found necessary. The learning process is constantly monitored and customized according to the received feedbacks.

The rest of the paper is organized as follows. In Section 2, the existing methods of using mobile technologies in teaching programming languages are reviewed. In Section 3, the

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proposed system is given. In Section 4, the results of the proposed system are discussed. The manuscript is concluded by Section 5.

1. LITERATURE REVIEW

There are a lot of previous work which emphasize the importance of mobile technologies in programming language teaching. It was proposed that teaching of computer programming can be done on mobile devices (Tillmann et al. 2012a, Tillmann et al. 2012b). It was explained that mobile learning supports the processes of teaching and learning (Mehdipour & Zerehkafi, 2013). Some important advantages of the use of mobile devices in the process of teaching and learning were mentioned (Crescente & Lee, 2011). It is explained that an effective training about problem solving, programming and logic can be provided with the use of mobile application activities. There are many examples of mobile applications developed to be used in teaching and learning process (Burston, 2011, Hsu & Ching, 2013, Wu, 2015, Rau et al, 2006). It is suggested that, smartphones motivate comprehension of students and allow them to engage with authors (Bromley, 2012). Researchers describe major developments and research studies that investigated the use of mobile technologies in higher education (Janice et al., 2008). And it is also explained that there is still a need for improvement (Hsu, & Ching, 2013).

2. PROPOSED SYSTEM

Proposed system contains 2 different interfaces for lecturer and students. Lecturer screen contains various facilities in order to manage course content and the educational process (figure 1). In the student screen; course topics, the latest course materials and statistical data can be seen. Instant communication with the lecturer can also be done.

Users log in to the application using user id and password. User id is their school number for students.

We used Android Studio to form the application. Adobe Photoshop CS6 was used in the preparation of visual elements.



Fig. 1. Lecturer screen of mobile application.

2.1. Lecturer Screen

Lecturer performs the following actions using this application:

- Class Statistics: Statistical information of whole class or a particular student is provided in class statistics section. This screen shows the progress of students in course subjects. Success rates and positions in class average are also given. The number of correct and incorrect answers in the test can be followed. The roll-call of students is done automatically by this application. Roll call results of students for the courses and tests can be seen by the lecturer (Figure 2).
- Add Material: In this section, new lecture notes, samples, videos, and tests about the course can be added. Documents are sent by selecting from mobile device memory. Videos which must be followed are sent by sharing server links. Moreover, scheduled and instant tests are created about a desired topic.
- Messages: All previous messaging conversations with students are listed in this field.
- Send Message: Lecturer can send messages with this button to a particular student or to the whole class.



Fig. 2. Roll call screen for a course.

2.2. Student Screen

Student screen of this mobile application can be seen in Figure 3. The course materials were given from simple to complex. In order to ensure the integrity of the course flow, relevant issues were given consecutively. Students can benefit from the following features on this screen:



- Course Subjects: Students can study the lecture notes on this screen. They can be prepared for the course before it begins. This feature also gives them the opportunity to repeat the course. Thus, they can correct the deficiencies after the course. Course subjects contain regular and ordered lecture notes, samples, training videos and assessment tests (Figure 4).
- Last Materials: Lecture notes, samples, videos, and tests sent by lecturer can be seen in this section. This part will be inactive while there is nothing new.
- Statistics: This section presents statistical data about the progress of students on subjects. Their success rates on tests are also given on this screen.
- Messages: All previous messaging conversations with lecturer are listed in this field. Students can send messages to lecturer in the same screen.



Fig. 3. Student screen of mobile application.



■ C# C# Eğitim Modülü	
Soru 7	
Aşağıdakilerden hangisi değişkenin türür integer'dan string'e dönüşüm yapan tip dönüşüm fonksiyonudur ?	າü
a) toString()	
b) parse	
c) float	
d) convert.toInt16	
-	

Fig. 4. Assessment test screen for students.

3. RESULTS

We have obtained various encouraging results with the use of our proposed system. With the use of this mobile application, the students have prepared for the topic before the lesson. They did daily repetitions. Deficiencies were determined by solving assessment tests. Encountered problems were solved by contacting to the lecturer through this application.

According to the usage results of this system, it was seen that the students were willing to learn more. Unlike the previous form of teaching, course management was maintained with more success. Attendance and performance of students were increased. Average grades of students for educational years of 2014, 2015 and 2016 are given in Table 1. This system has been implemented only for students studied in 2016.

Table 1. Average grades of students for years.				
	Average Grades of Students			
Educational	In Mid-term	In final		
Years	Exams	exams		
2014	59,34	58,68		
2015	60,70	57,02		
2016	69,85	68,15		

We applied this system to a class of 35 students. Table 2 shows the number of students not attending to the course. It can be seen that attendance of students to the courses is increased.



Week	Number of non-					
S	participating students					
	2014	2015	2016			
1	1	0	0			
2	0	1	0			
3	2	0	0			
4	3	2	1			
5	5	4	1			
6	2	5	0			
7	2	4	2			
8	4	6	1			
9	8	5	1			
10	4	8	3			
11	5	4	2			
12	9	7	3			
13	5	6	2			
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Table 2. The number of students not attending to the course for educational years 2015 and 2016.

4. CONCLUSION

It isn't enough to learn theoretical knowledge in order to be a programmer. Because it requires acquiring programming skills, it is difficult to learn a programming language. To this end, interest of students must be kept at a high level during the course period. The use of mobile technology in programming courses allows students to show more interest in the course. In this way, it is possible to increase attainments of students.

Lecturer efficiently manages the course and educational process by using this mobile application. With the use of statistical data, it becomes easier to see the participation and performance of students.

In sum, mobile technologies have reached to an important point that efficiently supports programming language education.

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A Web Based Data Mining Model to Enhance Success of Higher Education

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Abstract

Although an interactive system is intended in higher education, socio-economic status and personal characteristics of students are ignored. This deficiency has a negative impact on students' development and dynamism of the general education environment. A web based system was proposed to avoid such shortcomings using web programming techniques. This system contains personal, economic and social factors of students and controls them continuously. Using our proposed system, factors of students were recorded to a detailed database via this web interface. Elaborative queries can be done over this database in order to see current perspective. This database enables us to make data mining researches. Obtained researches give us significant unexpected relations. These results help to lecturers to improve educational methods.

Keywords: Computer Sciences, Information Technologies, Artificial Intelligence, Logic, Statistics

INTRODUCTION

Globalized academic disciplines in the world, have to focus on student profiles with attitudes and values rather than one type student profile. Student-centered education approach is a basic requirement that must be managed by using information technology for college students. The student's personal characteristics, educational background and demographic structure are necessary factors to be taken into account in the planning the training method.

The number of studies which uses information technology in student-centered teaching methods is so less. Recent years, web-based educational systems are emerging as an important innovation in education (Ha et al, 2000). We propose a new web-based system which manages all factors of students and educational process. In our proposed system, all factors which describes student properties are recorded to a database. Data mining researches were done using this elaborative database. It was aimed that teachers will be able to use more effective educational methods by using the results of these analyses.

The fact that the elements are not taken into account in traditional education was seen as a factor of education. It was seen that, a situation considered as irrelevant to education can be an important factor which affects student performance.

The rest of the paper is organized as follows. In Section 2, the existing researches which propose methods for enhancing educational process are reviewed. In Section 3, the proposed system is given. Our methodology is presented. In Section 4, the results of proposed system are discussed. The manuscript is concluded by Section 5.

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LITERATURE REVIEW

Recently, there have been unconventional changes in teaching practices in education (Sheard et al, 2003). The use of web-based systems in education has resulted in fundamental changes in teaching and learning.

There are a number of studies in this field which are mainly intended to enhance studentcentered learning in higher education (Lea et al., 2003) (Hwang et al, 2004). There are a lot of work that revealed the need to improve communication between teacher and students in order to increase the academic achievement of the students (Roorda et al., 2011) (Sheard et al, 2003). Several researchers emphasize the association between teacher-student relationship and social functioning of students (Ladd et al., 1999) (Skinner et al, 2009).

Some researches were focused on revealing important and exciting information in order to support educational process. There are some studies which apply data mining researches in order to improve learning (Romero & Ventura, 2007) (Tang, & McCalla, 2002) (Tang et al, 2000). Some of these researches used web-based educational systems (Romero & Ventura, 2007) (Muehlenbrock, 2005).

METHODOLOGY

The aim of this paper is to use data mining techniques to increase performance of students in courses. Analyses were made with the features of student portfolio information discovered from the web-based system. Data mining techniques were used to get meaningful results. Obtained results helped us to foresee possible success rate of new students' educational period.

We used C# interface of Visual Studio to write the codes. Graphic elements were designed with Adobe Photoshop CS5. Data mining tools of SPSS were used to make analyses.

Proposed system

We have developed a web-based system to collect detailed information about students. These information mainly contains data about demography, sociality, educational situation, health status, capabilities, hobbies and work experience of students.

Users log in to the application using user id and password. User id is their school number for the students. Passwords are given by their own consultant.

In the design process, relevant areas were grouped together in order to form a user-friendly interface. A screenshot of the system which students use to input their information can be seen in figure 1.

Consultant has got an interface where all the processes needed can be done (figure 2). The following processes are available for consultants:

- Give Password: Generates complex passwords for students.
- Student List: Displays standard student list with all recorded properties of them. Educational data are listed first.
- Income Status: Displays student list according to their income state and parents life situation. More destitute is shown first.
- Statistics: It gives a very detailed statistics about students. A sample screen of statistics is given in figure 3.
- Blood Group: It generates contact lists of students to access to a needed group in an emergency case.
- Change Password: Consultant can change own password here. Administrator can manage passwords of all users.
- Delete Record: It deletes the record of a student in cases of graduation, dropout, etc. It also moves this record to graduation or drop-out database.

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Fig. 1. Data entry screen of students.



Fig. 2. A screenshot of consultants interface.

"Student List" and "Income Status" include interfaces in which the consultant can communicate with the students when needed.

Data Mining Analysis

Data mining techniques were used in order to manage educational period effectively and measure student performance in vocational high school (Buldu, & Ücgün, 2010). In this way, level of achievement of students can be increased by motivating them. DataSets

Dataset is structured in different tables according to their characteristics. List of tables and number of data fields in the database are shown in table 1. In total, there are 7 data tables and 92 data fields. All tables have been related with each other through student id field which is student number.

The system only works within the school domain, and is not open to the Internet. Information of students can only be seen by own consultant.

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health_status	7
courses	14
pre_education	12
interests	9
teamwork_results	8

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Fig. 3. Statistics screen.

Table 2 shows data fields of "family&income" table. Field name, description and possible values of data fields were also listed.

Data	Description	Possible Values
Field		
TIF	Total Income of Family	{VeryHigh > 6500, High > 4500 & <=
		6500, Average > 2500 & <= 3500, Low >
		1400 & <= 2500, VeryLow >= 1400}
DP	Divorced Parents	{Yes, No}
NOS	Number of Siblings	{High >4, Average >2 & <=4, Low <= 2}
MW	Mother Works	{Yes, No}
FW	Father Works	{Yes, No}
RA	Residential Address	{In, Out}
SSA	Student Socail Activity	{High >5, Average >2 & <= 5, Low <= 2}
	(Number of Attended	
	Activity)	
SDO	Student Drop Out	{Yes, No}
FG	Final Grade	{VeryHigh > 85, High > 70 & <= 85,
		Average > 55 & <= 70,
		Low > 40 & ≤ 55 . VervLow >= 40}

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RESULTS

We have obtained various encouraging results with the use of our proposed system. The knowledge produced with the decision tree can be presented in the form of if-then rules. A sample rule set generated by decision tree was shown in table 3.

Ta	Table 3. Rule set generated by decision tree		
Rule No	Rule		
1	IF NOS=High AND MW=Yes THEN SDO=Yes		
2	IF DP=Yes AND RA=Out THEN FG=VeyLow		
3	IF MW=Yes AND FW=Yes AND RA=Out THEN FG=High		
4	IF MW=Yes AND FW=Yes AND RA=In THEN SSA=Low		
5	IF TIF=Low AND DP=No AND RA=Out THEN FG=High		
6	IF TIF=Average AND DP=No AND SSA=High THEN FG=Low		

Some of the information provided by these rules are listed below:

- If the number of siblings is high and mother works, student may tend to drop out of school.
- Foreign students with divorced parents are very unsuccessful.
- Foreign students are successful if their parents aren't divorced and has low income.
- Local students with working mother and father will be unsocial.

CONCLUSION

It was seen that conventional educational methods might not cover all students. Therefore it isn't adequate. In this paper, data classification technique was used on a wide dataset to predict probable educational success of students. The proposed system has helped to develop different teaching methods to meet changing student profile. External factors affecting the success of the students in the course were analyzed.

This system helped to consultants to determine the types of new students. Using this system is provided an estimate of students who tend to drop-out of school. It gave us information about factors which are present in failed students. In contrast, it also allows us to see the factors that support student achievement.

It has allowed the formation of a more efficient communication between teacher and students. Teacher determined the students having antisocial behavior and supports them to be social.

Partial results of the analysis are shared with students for information. The results are shared with the teacher and administration for strategy planning.

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Control of sustained release rate of anticancer drug from nanofibers

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Abstract

There is electrospinning method to one of the effective methods of making the nanofiber. The purpose of this study is the possibility of control of the drug release time of gelatin nanofibers that incorporate a cross-linked structure. The longer the thermal cross-linking time, the rate of drug release was slow. Drug release properties were found to be evaluated by the ICP-MS. We were able to simulate the release from the gelatin nanofiber.

Keywords: nanofiber, electrospinning, gelatin, anti-cancer agent **Main Conference Topic:** Polymer Science, Fiber and Biomaterial

Introduction

Medical application gelatin is extracted from pigs and cattle and fish collagen. The gelatin is one of a very high affinity for human biocompatible material. For long life time of drug release, thermal dehydration crosslinking in a vacuum is crosslinked by a condensation reaction of an amino group and a carboxyl group at high temperatures. For the drug release, nanofiber is a better structure to control the release speed.

There is electrospinning method to one of the effective methods of making the nanofiber. This is a spinning method in which anyone can easily polymer can be in the nanofiber. There are two type devices of electrospinning technics; one is the spinning of the nozzle type for the lab. Nozzle was made using the tip of a flat cut medical needle. Spinning direction is controlled by placing the electrode plates above and below the nozzle.

Another electrospinning is a coil type for industrial use. It is most important to investigate the relationship between the elapsed time and the drug release amount. Previously we quantified using liquid chromatography.

However, we tried to quantification by ICP-MS as a more simple approach at this time of this presentation. The purpose of this study is the possibility of control of the drug release time of gelatin nanofibers that incorporate a cross-linked structure. ICP-MS are possible in ppb level or less quantitative; also ICP-MS measurements are characterized by repetition of error is small.

Another objective is the establishment of quantification technology of drug release amount by ICP-MS.

Experimental

Gelatin used in the experiment are those derived from bone of cattle G - 2987P(cow) Mw = 100,000 (supplied from Nitta Gelatin Co. Ld.). Mode drug was using the vitamin VitaminB12 (Cyanocobalamin, Mw = 1,355.3) and carboplatin (Mw = 371.26).



Solvent either is Trifluoroethanol (TFA). We tried two types of cross-linking by thermal cross-linking and cross-linking agent to the gelatin. Curing agent of room temperature type is



VS-B (K-FJG, Mw =324.33) supplied from Fujifilm Fine Chemicals Co. Ltd (Fig.1). Cross-linking agent is a that Fujifilm has developed for gelatin. *Figure.1 Curing agent VS-B (K-FJG) Fujifilm Fine Chemicals Co., Ltd.*

Electrospinning device used was trade name NEU made Kato-Tech Co. Ltd. Figure 2 describes the method of measuring the drug release amount. After immersion in the nanofiber is physiological saline solution containing the drug, and then regularly collected saline at a filter with a syringe. ICP-MS has cobalt in vitamin B12 at a level of ppb also it is possible to detect the platinum in carboplatin. ICP-MS is Parkinson Nell Marr ELAN DRC-e (10534254).



Figure 2 Method of measuring the drug release amount

Result and Discussion

Fig.3 are SEM image of showing visually the relationship between the solution concentration and the fiber diameter of gelation nanofibers More the concentration of the solution increases, the fiber diameter became thicker. This result is similar to other polymers. Average fiber diameter is 5wt%; 720nm, 6wt%:835nm 7wt%:891nm, 8wt% 1760 nm.



Figure 3 SEM images of gelatin nanofiber. (5 ~10 wt %)



This is considered to be because the viscosity increases with increasing gelatin concentration. Thermal crosslinking temperature was carried out at 70 °C the drug is not denatured. After cross-linking was no change in the fiber diameter. Fiber diameter has become thinner in the addition of a cross-linking agent in an aqueous gelatin solution. This cause of this is currently under investigation. Due to the gelatin molecule chain cleanly arranged by the cross-linking agent, entanglement of the molecular chain is reduced, there may be for the viscosity of the solution was reduced.

Higuchi equation is famous as a theoretical model of the rate of drug release. Drug release rate is proportional to the square root of the elapsed time. However, the rate of drug release from nanofibers did not apply to this equation. Drug will be the very first to release in a short period of time from the surface of the nanofiber. Next will be released from the crystal portion and the bridge portion of the nanofibers. The last will be released by the decomposition of the nanofibers (Fig.4). Release of the drug from the gelatin will be in equilibrium after 40 minutes. It reduces the amount of drug that is finally released in the cross-linking. Since the thermal cross-linking is weak, the release rate of the drug is the dominant degradation of the nanofiber. We present a new equation for the nano size fibers (eq.1)



Figure 4 Schematic diagram of the release of the drug from the nanofiber

$$Q = \sqrt{\frac{1}{\emptyset^{m}} \left(k_1 D_1 + \frac{k_2 D_2}{C_{ro} C_{ry}} + k_3 D_3 \right)} \times t^n = a \times t^n \quad equation1$$

 D_1 : The diffusion coefficient of drug released from the amorphous part of the gelatin D_2 : The diffusion coefficient of drug released from the captured partial crosslinking portion and the crystal portion of the gelatin D_3 : The diffusion coefficient of the drug released by the decomposition of gelatin nanofiber Φ :Diameter of nanofiber ki(i=1-3):k1 is the fraction of the amorphous part of gelatin nanofiber k2 is the fraction of the crystal and cross-linking k3 is fraction which is firmly held to the cellulose

Q:Release the amount of drug

t: elapsed time

The use of a cross-linking agent is possible to control the release rate of the drug (Fig.5) Fig.6 is the result of the release rate of the anti-cancer agent. That, in combination with thermal crosslinking and chemical crosslinking, enables to control the release rate of the drug by controlling the crosslinking density of the gelatin. In order to know the rate of drug release from different gelatin molecular structure, we estimate the diffusion coefficient using molecular dynamics. The diffusion coefficient that matches the experimental results were calculated using a molecular dynamics (.Scigress ver2.7.1 (Fujitsu)) Drug release experiment results and our model equation from the nanofiber by using three of the diffusion coefficient showed a good match (Fig.7).







Figure 5 Drug release curves (Vitamin B12). Degradation gelation 5 wt% with VB12 and VS-B curing agent).



Figure 6 Drug release curves. (carboplatin). 5 wt% + Anti-cancer agent.





CARBOPLATIN

Figure 7 Drug release rate of the anti-cancer agent.

Conclusion

As the gelatin concentration increases, the fiber diameter is increased. Fiber diameter is constant without depending on the heat treatment time. Suggests that to control the fiber diameter by thermal cross-linking is not possible. But fiber diameter is reduced with the addition of chemical cross-linking agent.

The longer the thermal cross-linking time, the rate of drug release was slow. Thermal cross-linking was slow the rate of degradation. It has been added a cross-linking agent was found to be released over a long period of time. When the thermal crosslinking sites are too large, vitamins would be encapsulated in the mesh of the gelatin. The release rate was found to be different when changing the drug. Mutual relationship of the gelatin is considered as a cause. Suggesting that can control the drug release behavior by the heat treatment time and additives Drug release properties were found to be evaluated by the ICP-MS. We were able to simulate the release from the gelatin nanofiber.

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The Low Complexity Signal Detection Scheme for Reducing the Power Consumption in MIMO-OFDM Systems

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Abstract

The detection scheme of the receiver is very important for achieving high data rate using multiple antennas. Many detection schemes for multiple input multiple output with orthogonal frequency division multiplexing (MIMO-OFDM) detector have been developed to have high performance and low complexity. Among detection algorithms, the breadth-first tree searching (BFTS) detection scheme such as QR decomposition with M algorithm (QRD-M) has near-ML performance but the complexity is too high. To satisfy detection performance and complexity, the combined with K-best BFTS and LR aided successive interference cancellation (SIC) detection scheme is proposed in this paper. The proposed detection scheme uses the channel condition to control adaptively performance and complexity. Simulation results show that the proposed scheme has good error performance with low complexity.

Keywords: MIMO, Channel Condition, BFTS, Lattice Reduction **Main Conference Topic:** Communication Technology, Digital Signal Processing

Introduction

Multiple input multiple output with orthogonal frequency division multiplexing (MIMO-OFDM) system is used in many parts of the wireless communication systems [1]. The transmitters in MIMO-OFDM systems transmit simultaneously data streams and each antenna of the receiver receives transmitted data streams at same time. The detection scheme of the receiver is very important for achieving high data rate using multiple antennas. Many detection schemes for MIMO-OFDM detector have been developed to have high performance and low complexity. In many detection schemes, the maximum likelihood (ML) detection scheme is optimal detection scheme but its complexity is exponentially increased by the number of transmit antenna and increasing modulation order. The breadth-first tree searching (BFTS) detection scheme such as QR decomposition with M algorithm (QRD-M) has near-ML performance [2]. However, the detection scheme is also increased exponentially by the number of transmit antennas, the number of candidates of the symbol combination and modulation order. The linear detection scheme and lattice reduction (LR) aided detection scheme have very low complexity but its performance is unsatisfactory.

To satisfy detection performance and complexity, the combined with *K*-best BFTS and LR aided successive interference cancellation (SIC) detection scheme is proposed in this paper. The proposed detection scheme uses the channel condition to control adaptively performance and complexity. The threshold is calculated by the channel condition number.



The *K*-best BFTS detection scheme part and LR aided SIC detection scheme part are divided by the threshold.

From the simulation results, the proposed detection scheme has high performance with low complexity.

System Model



Figure 1: The MIMO-OFDM system model

The MIMO-OFDM system with N_t transmit and N_r receive antennas is considered in this paper. At the transmitter, the data is divided into N_t sub-streams by serial to parallel and each sub-stream is changed into the constellation of quadrature amplitude modulation (QAM) symbol. The inverse fast Fourier transform (IFFT) changes the QAM symbols into the timedomain symbols and the cyclic prefix (CP) is added to the time-domain symbols. Each transmit symbol pass through a Rayleigh flat fading channel.

At the receiver, each receive antenna receives all time-domain symbols and the CP is removed. After CP is removed, the fast Fourier transform (FFT) changes received symbols into the frequency-domain symbols. The received symbols are denoted as follows,

$$\mathbf{Y} = \mathbf{H}\mathbf{X} + \mathbf{N},$$
(1)

where $\mathbf{Y} = \begin{bmatrix} Y_1, Y_2, \dots, Y_{N_r} \end{bmatrix}^T$ is the $N_r \times 1$ received symbol vector, **H** is the $N_r \times N_t$ Rayleigh fading channel matrix, $\mathbf{X} = \begin{bmatrix} X_1, X_2, \dots, X_{N_t} \end{bmatrix}^T$ is the $N_t \times 1$ transmit symbol vector and $\mathbf{N} = \begin{bmatrix} N_1, N_2, \dots, N_{N_r} \end{bmatrix}^T$ is the $N_r \times 1$ additive white Gaussian noise (AWGN) vector and $\begin{bmatrix} \bullet \end{bmatrix}^T$ is transpose operator. The Figure 1 shows the considered MIMO-OFDM system model.

Conventional Signal Detection Schemes

This section explains the conventional signal detection schemes which are *K*-best BFTS detection scheme and LR aided linear detection scheme.

The conventional *K*-best BFTS detection scheme starts from QR decomposition (QRD). The **H** is decomposed as follows,

$$\mathbf{H} = \mathbf{Q}\mathbf{R},\tag{2}$$

where **Q** is $N_r \times N_t$ unitary matrix and **R** is $N_t \times N_t$ upper triangle matrix. By multiplying **Y** with **Q**^{*H*}, the received symbol vector is rewritten as follows,

$$\mathbf{Y}' = \mathbf{Q}^H \mathbf{Y} = \mathbf{Q}^H \mathbf{H} \mathbf{X} + \mathbf{Q}^H \mathbf{N} = \mathbf{R} \mathbf{X} + \mathbf{N}', \tag{3}$$



where N' is noise vector which has the same statistical noise properties with N and $[\bullet]^H$ is Hermitian operator. At the first layer, the nodes are extended to *M* child nodes where *M* is the number of symbols of QAM. The conventional *K*-best BFTS detection scheme starts calculation for the accumulated Euclidean distance (ED) between Y'_{N_t} and reference symbol as follows,

$$\mathbf{E}(M) = \left\| Y_{N_t}' - R_{N_t N_t} \mathbf{L}(M) \right\|^2 , \qquad (4)$$

where $\mathbf{L} = [L_1, L_2, ..., L_M]$ is the *M*-QAM reference symbol and $\mathbf{E}(M)$ is ED between Y'_{N_t} and reference symbol. The *K* child nodes which have small ED are selected to candidate paths ($K \le M$). At the second layer, the *K* nodes are extended to *M* child nodes and the conventional *K*-best BFTS detection scheme calculates accumulated ED and only *K* survivor paths which have the small accumulated ED are retained. The same operation performs until the last layer. At the last layer, only one survivor path which has the smallest accumulated ED is selected to estimated symbols. Figure 2 shows example of the *K*-best BFTS detection scheme. The bold lines are survivor paths at each layer and solid lines are unselected paths. At each layer, 4 paths are selected to survivor paths and at the last layer, only one path is selected to estimated symbols. The conventional *K*-best BFTS detection scheme achieves near-ML performance. But, the complexity of the *K*-best BFTS detection scheme is increased exponentially due to increase of the number of antennas, modulation set and the number of *K*.



Figure 2: The K-best BFTS detection scheme with QPSK in 4×4 MIMO-OFDM

The complex Lenstra-Lenstra-Lovász (CLLL) algorithm is to transform a given basis **H** into a new basis $\overline{\mathbf{H}}$ [3][4]. Usually, because $\overline{\mathbf{H}}$ is much better conditioned than **H**, less noise enhancement is caused for SIC detection.

The CLLL algorithm is performed and received symbol vector can be rewritten as follows,

$$\mathbf{Y} = \mathbf{H}\mathbf{T}\mathbf{T}^{-1}\mathbf{X} + \mathbf{N} = \overline{\mathbf{H}}\mathbf{Z} + \mathbf{N},\tag{5}$$

where **T** is unimodular matrix and contains only integer entries, $\overline{\mathbf{H}} = \mathbf{HT}$ is the channel with same lattice and has better conditioned than **H** and **Z** is the constellation in the *z*-domain. The influence of the **Z** is small because the $\overline{\mathbf{H}}$ is orthogonal.



Proposed Signal Detection Scheme

The proposed detection scheme calculates the channel condition number to control detection performance and complexity. The channel condition number is denoted as follows,

$$\aleph(\mathbf{H}) = \frac{\lambda_{\max}}{\lambda_{\min}} \ge 1$$
(6)

where λ_{\max} and λ_{\min} are the largest and smallest value of the singular value of **H**. The channel has good condition and less noise enhancement when the channel condition number is small. The threshold is defined by the mean of the channel condition number for all sub-carrier's channel and is denoted as follows,

$$\eta = \frac{1}{n} \sum_{i=1}^{n} \aleph_i(\mathbf{H}), \tag{7}$$

where *i* is the sub-carrier index and *n* is the number of sub-carrier. The detection part is divided into good-state and worst-state by the threshold. In the good-state, the number of the candidate symbol and the detection layer of *K*-best BFTS are small. In the worst-state, the number of candidate symbol and the detection layer of *K*-best BFTS are bigger than the good-state. The number of the candidates symbol and the detection layer of *K*-best BFTS are bigger than the adapted adapted by the system condition.

After K-best BFTS detection, LR-aided SIC detection is performed to remaining symbols. The \mathbf{H} is decomposed to the decomposed channel by canceling unnecessary channel response. The decomposed channel is denoted as follows,

$$\underline{\mathbf{H}} = \mathbf{H} - \sum_{k=N_t}^{\infty} \mathbf{H}_k \tag{8}$$

where \mathbf{H}_k is the *k* column of \mathbf{H} , *k* is an index of column, ω is the last layer of *K*-best BFTS. Because the LR is performed to \mathbf{H} and the SIC detection is performed, the remaining symbols are estimated more accurately with very small noise enhancement and interference with low complexity. The proposed detection scheme can be applied adaptably to the MIMO system by controlling the performance and the complexity.

Simulation Results

In this part, the Bit Error Rate (BER) and the complexity of the proposed detection scheme and the conventional detection schemes are shown. The used parameters of simulation are shown in Table 1.

Parameters			
FFT and IFFT size	256		
Modulation order	16-QAM		
Channel model	7 path Rayleigh fading channel		
The number of transmit and receive antenna	4×4		
Length of CP	64		
Noise	AWGN		

Table 1: The parameters of simulation

Figure 3 shows the BER performance of the proposed detection scheme and the conventional detection schemes with increasing Signal to Noise Ratio (SNR). The BER

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performance of the proposed detection scheme has good performance. The performance of the proposed detection scheme is about $1dB \sim 3dB$ better than the *K*-best BFTS detection scheme with *K*=7 and is about only 0.4 dB away from the *K*-best BFTS detection scheme with *K*=16 but the complexity is very low than the conventional detection schemes.



Figure 2: The BER performance of the detection schemes

Detection Schemes		Complexity
	<i>K</i> =7	3904
K-Dest BF15	<i>K</i> =10	6976
Detection Scheme	<i>K</i> =16	13120
Proposed Detection Scheme	<i>K</i> =11	4118
LR-aided SIC Detection Scheme	<i>K</i> =1	1526

Table 2: The complexity of the detection schemes

The complexity of the proposed detection scheme and the conventional detection schemes are shown in Table 2. The multiplication calculation is considered to the complexity. The complexity of LR-aided SIC detection scheme has very low complexity but the BER performance is too low compared to the other detection schemes. The proposed detection scheme has low complexity against the conventional *K*-best BFTS detection schemes.

Conclusion

In this paper, the efficient and adapted signal detection scheme based on the channel condition number is proposed. The proposed detection scheme has good BER performance

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with very low complexity. The proposed detection algorithm can be used adaptably in MIMO-OFDM system requiring low complexity.

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FD-MIMO System based on Adaptive Interference Cancellation Scheme

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Abstract

This paper presents a full-duplex (FD) multiple-input multiple-output (MIMO) relaying system based on adaptive interference cancellation scheme. The proposed interference cancellation scheme successively cancels the interference from transmitting antennas of source and self-interference from transmitting antennas of relay by unit of inter-stream. The order of partial cancellation is determined in according to the channel condition. The performance of successive partial interference cancellation scheme is evaluated and is compared by simulations. The results confirm that the system with the proposed scheme can achieve a significant performance gain compared with the conventional FD and half-duplex (HD) systems.

Keywords: Full-duplex, MIMO relaying, self-interference, channel condition **Main Conference Topic:** Signal Processing

Introduction

The demand of ever increasing high throughput and reliability for wireless services has required techniques that efficiently exploit limited radio resources. MIMO has been adopted as a key technique for achieving high spectral efficiency in many wireless communication standards such as long-term evolution (LTE) and wireless fidelity (WiFi). Also, cooperative relaying communication is an effective method to provide more extensive coverage, high throughput and reliability. The relaying communication is classified into FD and HD mode. Although FD mode can achieve maximum double throughput that can be achieved in HD mode, there is the implementation challenge for the self-interference [1]. Therefore, HD mode is mainly considered than FD mode for the system model of the papers based on cooperative relaying [2, 3]. This paper concentrates on the combination of MIMO and relaying technique with FD mode and presents interference cancellation scheme for achieving high spectral efficiency. The proposed scheme successively and partially cancels the self-interference and the MIMO interference by the source node.

Successive Partial Interference Cancellation

As shown in Fig. 1, this paper considers FD-MIMO relaying consisting of source (S), relay (R) and destination (D). Because the purpose of this paper is to minimize the generated interference in the relay, the received signal at the relay is only considered. The received signal is represented as follows:

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$$Y = H_{SR}X_{S} + H_{RR}X_{R} + N$$

= $\sum_{i=1}^{N_{R}^{r}} \sum_{j=1}^{N_{S}^{i}} h_{SR}^{(i,j)} x_{S}^{j} + \sum_{i=1}^{N_{R}^{r}} \sum_{j=1}^{N_{R}^{i}} h_{RR}^{(i,j)} x_{R}^{j} + N$
(1)

where H_{SR} is the MIMO channel between source and relay, H_{RR} is the MIMO channel between transmitting antennas and receiving antennas of relay, and $h^{(i,j)}$ is the channel between the *j*-th transmitting antenna of transmitter and the *i*-th receiving antenna of receiver. X_s and X_R are the MIMO signals from source and relay, respectively. x^j is the transmitting signal from the *j*-th transmitting antenna and N is the additive white Gaussian noise (AWGN). N_s^{t} is the number of transmitting antennas of source, N_R^{t} and N_R^{r} are the number of transmitting and receiving antennas of relay, respectively. In this paper, $N = N_s^{t} = N_R^{r} = N_R^{t}$ is considered.



Figure 1: Full-duplex MIMO relaying system model

In order to compensate the interference, the channel estimation should be preceded. The non-ideal channel estimation is defined as follows:

$$H_{SR} = \hat{H}_{SR} + \Delta \hat{H}_{SR} \tag{2}$$

$$H_{RR} = \hat{H}_{RR} + \Delta \hat{H}_{RR} \tag{3}$$

where \hat{H} is the estimated channel and $\Delta \hat{H}$ is the estimation error. Also, the relative estimation error is defined as follows:

$$\varepsilon_{H}[dB] = 10 \log \frac{|H|^{2}}{|\Delta \hat{H}|^{2}}$$

(4)

 ε_{H}^{SR} and ε_{H}^{RR} mean the relative estimation error of H_{SR} and H_{RR} , respectively.

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Singular value decomposition (SVD) for the estimated \hat{H}_{RR} is executed as follows: $\hat{H}_{RR} = \tilde{U}\tilde{\Sigma}\tilde{V}^{H}$

(5)

where \tilde{U} and \tilde{V} are orthonormal matrixs satisfied with $\tilde{U}^{H}\tilde{U} = I$ and $\tilde{V}^{H}\tilde{V} = I$, respectively. Also, $\tilde{\Sigma}$ is diagonal matrix with the singular values. Decomposition for the cancellation of self-interference is executed as follows:

$$\hat{F}_{rx}H_{RR}\hat{F}_{tx} = \frac{\tilde{U}^{H}}{\sqrt{\tilde{\Sigma}}}U\Sigma V^{H}\frac{\tilde{V}}{\sqrt{\tilde{\Sigma}}}$$

(6)

where \hat{F}_{rx} and \hat{F}_{tx} are receive and transmit filter based on SVD decomposition, respectively [4].

As the cancellation scheme of the vertical Bell laboratories layered space time (V-BLAST), QR-decomposition for the estimated \hat{H}_{sR} is executed as follows:

$$\hat{H}_{SR} = \hat{Q}\hat{R}$$

(7)

where \hat{Q} is an orthonormal matrix satisfied with $\hat{Q}\hat{Q}^{H} = I$ and *R* is an upper triangular matrix [5]. Decomposition for the cancellation of MIMO interference is executed as follows:

$$\hat{Z} = \hat{Q}^{H} H_{SR} X_{S} = \hat{Q}^{H} QR X_{S}$$

$$= \begin{bmatrix} \hat{z}_{1} \\ \hat{z}_{z} \\ \vdots \\ \hat{z}_{N} \end{bmatrix} = \begin{bmatrix} \hat{r}_{1,1} & \hat{r}_{1,2} & \cdots & \hat{r}_{1,N} \\ \sigma_{2,1} & \hat{r}_{2,2} & \cdots & \hat{r}_{2,N} \\ \vdots & \vdots & \ddots & \vdots \\ \sigma_{N,1} & \sigma_{N,2} & \cdots & \hat{r}_{N,N} \end{bmatrix} \begin{bmatrix} x_{1} \\ x_{z} \\ \vdots \\ x_{N} \end{bmatrix}$$

(8)

where σ is the component by the non-ideal channel estimation.

In order to simultaneously minimize the interferences by the MIMO and selfinterference channel, the partial cancellation is successively executed. The *m*-th partial cancellation order is determined as follows:

$$k_{m} = \arg\min_{k \in \{1,2,\dots,N-m\}} \left\{ \sum_{n=1}^{N-m} (\sigma_{N-m+1,n})^{k} + (\hat{F}_{rx}H_{RR}\hat{F}_{tx})_{k} \right\}$$
(9)

where $()^k$ means the result from cyclic rotated \hat{H}_{sr} from the *k*-th row to the *m*-th row and $()_k$ means the *k*-th row of matrix. Because the relay can know transmitting signal X_r , if the ideal

estimation of self-interference channel is possible, $\hat{F}_{rx}H_{RR}\hat{F}_{tx}$ is equivalent to unit matrix in (7) and the self-interference is perfectly cancelled. Also, the ideal estimation of MIMO channel is possible and all σ are zero in (10). Because the cancellation of MIMO channel is executed by unit of each row in (10) and the terms for MIMO and self-interference channel are added such as (1), the objective for cancellation is defined with the procedure by unit of row and the summation of each interference factor about MIMO and self-interference channel. k_m means the index of row with minimum interference in the *m*-th step of cancellation. In the state of cyclic rotated in according to k_m , the partial cancellation is executed as follows:

(10)

 $\tilde{x}_m = Q \left[\left\{ \left(\hat{Q}^H \tilde{Y} \right)_m - \sum_{n=1}^{m-1} \hat{r}_{m,n} \tilde{x}_n \right\} / \hat{r}_{m,m} \right]$

 $\tilde{Y} = Y - (\hat{F}_{rr}H_{PP}\hat{F}_{rr}X_{P})$

(11)

where \tilde{x}_m means the *m*-th detected signal. After the *m*-th step is executed, the k_m -th rows of the matrix for received signal and estimation matrices are canceled.

The interference by MIMO and self-interference channel is induced in order that the received signal is minimally affected by the interference. Also, by removing the selected rows of matrices for the partial interference cancellation, the non-ideal components of estimated matrices are removed and the performance of interference cancellation can be improved.

Simulation Result

This section presents the simulation results in according to the relative estimation error. The compared schemes are the proposed scheme without (11) and independent cancellation scheme for MIMO and self-interference channel in FD system and HD system. If the ordering of partial interference cancellation is omitted, the non-ideal components aren't effectively removed.

In the simulation, the system with N = 4 is considered. The transmission power of each antenna is uniformly assigned and Rayleigh fading channel with random path length is used for the channel between each antenna. Also, signal-to-noise ratio (SNR) is assumed as 25dB.





Figure 2: Throughput performance for the conventional and proposed scheme in according to the relative estimation error

Fig. 2 shows the relative throughput performance for HD system. 'conv' in the legend means the conventional scheme with the independent cancellation for the MIMO and self-interference channel. The performance is dominated by the estimation error. When $\varepsilon_{H}^{RR} = 5$ dB, the proposed scheme has about 2.5dB gain compared with the conventional scheme at about 28dB of ε_{H}^{SR} . Also, when $\varepsilon_{H}^{RR} = 15$ dB, the proposed scheme has about 2.5dB gain compared scheme has about 2.5dB gain compared with the conventional scheme at about 15dB of ε_{H}^{SR} . In the system with 25dB of ε_{H}^{RR} , the proposed scheme has about 2.5dB gain compared with the conventional scheme at about 10dB of ε_{H}^{SR} . From this simulation results, it is confirmed that the proposed scheme ensures the performance enhancement in the environment of low accuracy for the channel estimation. In addition, the omission of partial cancellation ordering degrades the performance of proposed scheme. Therefore, the ordering is important in the system with the high estimation error.

Conclusion

FD-MIMO relaying is potential technique that efficiently exploits limited radio resources. In this paper, we focus on solving the technical problem for the simultaneously minimizing the inter-stream interference and self-interference. The proposed interference cancellation scheme successively and partially cancels the inter-stream and self-interference by unit of inter-stream in according to the channel condition. Error propagation by unit of inter-stream is caused by the non-ideal channel estimation. The interference is induced in order that the received signal is minimally affected by the error propagation. Because of the

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cancellation based on the estimated channel, the performance of the cancellation is dominated by the estimation accuracy. However, the simulation results using measured data show that the proposed adaptive interference cancellation scheme can provide very significant throughput improvement for FD-MIMO system.

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Improved Multi-Hop Wireless Communication Systems with Relay Selection

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Abstract

This paper proposes an improved multi-hop wireless communication systems. The multi-hop wireless communication systems provide the extended range of wireless communication system. The relay selection scheme greatly affects the performance of the multi-hop systems. Therefore, the relay selection scheme is important to improve the performance of the wireless communication systems. The proposed scheme selects the relay according to the channel condition. Thus, the proposed scheme can provide the suitable relay selection. In multi-hop systems, performance degradation is caused by an increase in the number of hops. The proposed scheme uses the cooperative communication system in order to prevent the performance degradation. The simulation results show that the performance of proposed scheme has better than conventional scheme.

Keywords: Cooperative communication, Multi-hop, Relay selection **Main Conference Topic:** Communication Technology, Digital Signal Processing

Introduction

Recently, the wireless communication systems require the high reliability and data rate in order to provide high quality service. The multiple input multiple output (MIMO) system can solve these requirements. The MIMO system uses the multiple antennas of the transmitter and receiver. In the MIMO system, there are two types of gain. The multiplexing gain can provide a high data rate by using the multiple antennas. The multiplexing gain can be obtained by simultaneously transmitting different signals from the multiple antennas. On the other hand, the diversity gain can provide a high reliability. The diversity gain can be obtained by simultaneously transmitting same signals from the multiple antennas. As a result, the MIMO system can improve the performance of the wireless communication system. Additionally, the MIMO system does not require additional bandwidth. So, the MIMO system has been widely used in the wireless communication systems. Because the user equipment (UE) is limited in the size and cost, the additional antenna installation for the MIMO system is difficult [1].

The cooperative communication system can solve the problem of the MIMO system. In the cooperative communication system, the UE can be used like a relay. The cooperative communication system composes the virtual MIMO system by using another UE. As a result, the cooperative communication system does not require additional antenna installation. In the cooperative communication system, there are amplify and forward (AF) and decode and forward (DF) method. The AF method amplifies and retransmits the received signal. The DF



method decodes and retransmits the received signal. Additionally, the cooperative communication can extend the coverage of the wireless communication system by using other user mobile devices as the relays [2].

The relay selection scheme is important in the multi-hop wireless communication system. If the channel condition of the relay is poor, the performance of the system is decreased. If the channel condition of the relay is excellent, the performance of the system is improved. So, the relay selection scheme should consider the channel condition. The best harmonic mean (BHM) relay selection scheme is known as optimal scheme for relay selection. The BHM scheme needs the channel state information (CSI) and calculates the harmonic mean of channel responses. And then the relay that has the largest harmonic mean is selected. The threshold based relay selection scheme usually uses the signal-to-noise (SNR) [3][4].

This paper is organized as follows. The system model section shows the system model of the proposed scheme. In the proposed scheme section, the proposed scheme is explained in detail. The simulation results show the performance comparison between the conventional and proposed scheme. The conclusion section is final.

System Model

This section describes the system model. Figure 1 shows the system model of the proposed scheme. The proposed scheme is based on the orthogonal frequency division multiplexing (OFDM). The system model consists of the base station (BS), the two candidates and the destination. In the system model, all UEs can perform the function of the relay. The BS selects the relay by using the proposed relay selection scheme. The relays use the DF method for the cooperative communication. The proposed scheme assumes that there is no a direct path between the BS and the destination.



Figure 1: The system model of the proposed scheme

In the Figure 1, H_{BS,r_n} means the channel between the BS and the *n*-th relay and the *n* means the index of candidates. The first candidates are relay candidates near the BS. The proposed scheme can extend the wireless communication range by using the cooperative communication. The CSIs are obtained through the channel estimation and the channel estimation is assumed perfect. The channels are 7-path Rayleigh channel and independent.



Proposed Scheme

In this section, the proposed scheme is described in detail. The proposed scheme uses a mixture of the BHM scheme and the threshold based relay selection scheme. The threshold based relay selection scheme use the SNR of the received signal as threshold. Additionally, the proposed scheme uses the cooperative communication in order to prevent performance degradation caused by an increase in the number of hops. And then, the cooperative communication system uses the DF method. In the proposed scheme, there is no the direct path between the BS and the destination. Therefore, The BS uses the relays in order to transmit the signal to the destination.

In the proposed scheme, the relays are selected through the two step. In the first step, the BHM scheme is used to select the new candidates that have the better than threshold. The threshold is as follows,

$$\eta_{BHM} = \frac{\sum_{n=1}^{N} \frac{1}{\left| H_{BS, r1_n} \right|^{-2} + \left| H_{r1_n, r2_n} \right|^{-2} + \left| H_{r2_n, D} \right|^{-2}}}{N}.$$
(1)

The N is the number of the relay candidates. In the second step, the threshold based relay selection scheme is used to select the relays. The selected relays have the better than the second threshold. The second threshold is as follows,

$$\eta_{SNR} = \frac{\sum_{n=1}^{N} SNR_{BS,r1_n} + SNR_{r1_n,r2_n} + SNR_{r2_n,D}}{N}.$$
 (2)

Because the proposed scheme considers the harmonic value and the SNR of the received signal, the proposed scheme can select the suitable relays.

In the multi-hop wireless communication, performance degradation is caused by an increase in the number of hops. This performance degradation can solve by using the cooperative communication. In the proposed scheme, the BS transmits the same signal to relay 1 and relay 2. In the relay 1 and relay 2, the received signals are as follows,

$$Y_{relay_k} = SH_{BS,r_k} + N_k, \quad (k=1,2),$$
 (3)

where k means the relay index and N means the additive white Gaussian noise (AWGN). The relay 1 and relay 2 retransmit the signal to the relay 3 and relay 4 by using the DF method. In the relay 3 and relay 4, the received signals are as follows,

$$Y_{relay_3} = a_{1,r_3} \hat{S}_{r_1} H_{r_1,r_3} + a_{2,r_3} \hat{S}_{r_2} H_{r_2,r_3} + N_3, \qquad (4)$$

$$Y_{relay_4} = a_{1,r_4} \hat{S}_{r_1} H_{r_1,r_4} + a_{2,r_4} \hat{S}_{r_2} H_{r_2,r_4} + N_4 \,, \tag{5}$$

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where Equation (4) and (5), a_1 and a_2 mean the combining factor. The combining factors help the destination obtain the improved SNR of the received signal. The a_1 and a_2 are as follows,

$$a_n = \frac{H_{r_k,destination}^*}{N_0^{r_k,destination}}, (n = 1, 2),$$
(6)

where notation (*) means conjugate calculation and the N_0 means the power of the AWGN. The relay 3 and relay 4 retransmit the signal to the destination by using the DF method. In the destination, the received signal is as follows,

$$Y_{Destination} = a_{1,D} \hat{S}_{r_3} H_{r_3,D} + a_{2,D} \hat{S}_{r_4} H_{r_4,D} + N_D.$$
(7)

The proposed scheme can prevent the performance degradation by using the combining factor of the DF method. Thus, the proposed scheme can provide the improved multi-hop wireless communication.

Simulation Results

In this section, the parameters and results for the simulation are explained. The simulations are performed by MATLAB program. The simulation is based on the OFDM system. Table 1 shows the parameters for the simulation. The channels are assumed to be constant during one-time slot. The quadrature phase shift keying (QPSK) is used for the comparison between the proposed and conventional scheme in the low modulation type. The quadrature amplitude modulation (QAM) is used for the comparison between the proposed and conventional scheme in the proposed and conventional scheme in the high modulation type.

Туре	Value
Modulation type	QPSK, 16-QAM
Range of SNR (dB)	-10~14 (QPSK) 0~30 (16-QAM)
FFT size	256
Cyclic prefix	(FFT size)/4
Channel code	Convolutional code
Code rate	1/2
The number of the relay candidates	20

Table 1: Parameters for the simulation

In this section, the proposed scheme is compared with the two conventional schemes. The first conventional scheme uses the BHM scheme but does not use the DF method. Thus, the first conventional scheme cannnot prevent the performance degradation caused by an increase in the number of hops. The second conventional scheme uses the DF method and random relay selection scheme. The random relay selection scheme selects any one of the relay candidates. Thus, the second conventional scheme cannot provide the suitable relay according to the channel state. Figure 2 and 3 show the BER performance of the proposed



and conventional schemes. The simulation results show that the proposed scheme has better performance than the performance of the conventional schemes.



Figure 2: BER performance of the proposed and conventional schemes (QPSK)



Figure 3: BER performance of the proposed and conventional schemes (16-QAM)

Conclusion

This paper proposes the improved multi-hop wireless communication scheme. The multi-hop wireless communication system helps the wireless communication system expand the range of communication. However, the multi-hop wireless communication systems have the performance degradation caused by an increase in the number of hops. The proposed scheme can prevent this problem by using the DF method. Additionally, the proposed scheme

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can select the suitable relays according to the channel state. Thus, the proposed scheme can be usefully used in the multi-hop wireless communication systems.

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Efficient Signal Transmission Scheme in MIMO-OFDM Systems

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Abstract

This paper proposes an efficient signal transmission scheme in multiple input multiple output-orthogonal frequency division multiplexing (MIMO-OFDM) systems for high error performance and low complexity. Unlike the conventional spatial multiplexing, the proposed transmission scheme uses spatial diversity additionally. In the proposed scheme, the used spatial diversity scheme is cyclic delay diversity (CDD) which has great error performance when the channel coding is used. To minimize the loss of the throughput of the proposed scheme compared to the conventional spatial multiplexing scheme, the CDD is used when the estimated channel response has poor quality. Also, many receive antennas are not required due to composite channel of the CDD and it can be useful specially in MIMO downlink channel.

Keywords: MIMO-OFDM, Hybrid transmission, CDD, LR-aided ZF **Main Conference Topic:** Communication Technology, Digital Signal Processing

Introduction

Multiple input multiple output-orthogonal frequency division multiplexing (MIMO-OFDM) system is one of the popular wireless communication systems. The MIMO-OFDM system can increase channel capacity without wide bandwidth and high transmit power compared to single input single output-orthogonal frequency division multiplexing (SISO-OFDM) system [1]. However, many advantages of the MIMO-OFDM system is based on signal detection scheme which has high complexity at the receiver. Also, the error performance is very low relative to high complexity at the receiver. For higher error performance, several detection algorithms were proposed. However, these algorithms are hard to use in the real-time systems due to very high complexity and cannot be used in huge MIMO-OFDM systems which have many antennas and use high order modulation. Thus, this paper proposes efficient transmission scheme for high error performance and low complexity. Unlike many spatial multiplexing schemes, the proposed scheme uses spatial diversity scheme additionally. The popular spatial diversity schemes in recent wireless communication systems are cyclic delay diversity (CDD) [2]-[3] and space-time block code (STBC) which is called as Alamouti code [4]. In this paper, the used spatial diversity scheme is the CDD because the transmission structure of the STBC uses both space and time block for orthogonal structures and it requires many time slots. However, the transmission structure of the CDD is very simple and it can minimize the loss of the data rate of the proposed scheme compared to the STBC. Additionally, to minimize the loss of the data rate compared to the conventional spatial multiplexing scheme, antennas which use the CDD are selected by



estimating channel response. The transmit antennas which correspond to poor channel quality use the CDD. On the contrary, the transmit antennas which correspond to great channel quality use the conventional spatial multiplexing scheme. Also, the receiver uses lattice-reduction aided zero forcing (LR-aided ZF) for high error performance relative to low complexity [5].

System Model

In this paper, the MIMO-OFDM system model which has N_t transmit antenna and N_r receive antenna is considered. The MIMO receive vector $\mathbf{Y} = \begin{bmatrix} Y_1 & Y_2 & \cdots & Y_{N_r} \end{bmatrix}^T$ where $(\cdot)^T$ is transpose operator without an index of subcarrier is as follows,

$$\mathbf{Y} = \mathbf{H}\mathbf{X} + \mathbf{N},\tag{1}$$

where **H** denotes complex Rayleigh flat channel, $\mathbf{X} = \begin{bmatrix} X_1 & X_2 & \cdots & X_{N_t} \end{bmatrix}^T$ denotes MIMO transmit vector and $\mathbf{N} = \begin{bmatrix} N_1 & N_2 & \cdots & N_{N_r} \end{bmatrix}^T$ denotes zero mean complex additive white Gaussian noise (AWGN).

The channel matrix H is assumed to be rich scattering environment and is as follows,

$$\mathbf{H} = \begin{bmatrix} H_{11} & H_{12} & \cdots & H_{1N_t} \\ H_{21} & H_{11} & \cdots & H_{2N_t} \\ \vdots & \vdots & \ddots & \vdots \\ H_{N_t 1} & H_{N_t 2} & \cdots & H_{N_t N_t} \end{bmatrix},$$
(2)

where H_{ij} , i.e. $i = 1, 2, \dots, N_r$, $j = 1, 2, \dots, N_t$ is transfer function from the *j*-th transmit antenna to the *i*-th receive antenna. Figure 1 shows overall MIMO-OFDM system model.



Figure 1: The MIMO-OFDM system model

CDD

The CDD is one of the simple spatial diversity schemes because the transmit signals are simply cyclic delayed version for the original signal. The cyclic delay at each transmit antenna is different each other and it can increase the frequency selectivity of the channel. So, the error performance of the CDD is improved when the channel coding is applied because

the error is distributed at the receiver like interleaving. The MIMO received vector $\mathbf{Y}_{\text{CDD}} = \begin{bmatrix} Y_{\text{CDD},1} & Y_{\text{CDD},2} & \cdots & Y_{\text{CDD},N_r} \end{bmatrix}^T$ is follows,

$$\begin{bmatrix} Y_{\text{CDD},1} \\ Y_{\text{CDD},2} \\ \vdots \\ Y_{\text{CDD},N_r} \end{bmatrix} = \begin{bmatrix} H_{11} & H_{12} & \cdots & H_{1N_r} \\ H_{21} & H_{11} & \cdots & H_{2N_r} \\ \vdots & \vdots & \ddots & \vdots \\ H_{N_r1} & H_{N_r2} & \cdots & H_{N_rN_r} \end{bmatrix} \begin{bmatrix} X_{\delta_1} \\ X_{\delta_2} \\ \vdots \\ X_{\delta_{N_r}} \end{bmatrix} + \begin{bmatrix} N_1 \\ N_2 \\ \vdots \\ N_{N_r} \end{bmatrix},$$
(3)

where X_{δ_i} is δ_j cyclic delayed transmit symbol.

In Equation (3), due to the property of the fast Fourier transform (FFT), the relation between the different transmit symbols is as follows,

$$X_{\delta_m} = X_{\delta_n} e^{-j\frac{2\pi k(\delta_n - \delta_m)}{N}},\tag{4}$$

where N denotes FFT size.

By using Equation (4), Equation (3) can be rewritten as follows,

$$\begin{bmatrix} Y_{\text{CDD},1} \\ Y_{\text{CDD},2} \\ \vdots \\ Y_{\text{CDD},N_r} \end{bmatrix} = \begin{bmatrix} H_{\text{C},1} \\ H_{\text{C},2} \\ \vdots \\ H_{\text{C},N_r} \end{bmatrix} X + \begin{bmatrix} N_1 \\ N_2 \\ \vdots \\ N_{N_r} \end{bmatrix},$$
(5)

where $H_{C,i} = \sum_{j=1}^{N_r} H_{ij} e^{-j\frac{2\pi k \delta_j}{N}}$, i.e. $i = 1, 2, \dots, N_r$ is transfer function of composite channel

reponse and X is non-cyclic delayed original symbol.

The transmit symbols are estimated by applying the receive diversity scheme in Equation (5).

Proposed Scheme

The proposed scheme uses the CDD when the estimated channel response has poor quality to use the channel environments efficiently. The used channel estimation scheme is least-square (LS) due to simple structures. After the channel estimation, it is assumed that $N_{\rm SM}$ transmit antennas use the spatial multiplexing and $N_{\rm CDD} + 1 = N_t - N_{\rm SM}$ transmit antennas use the CDD. For easy explanation, it is also assumed that the spatial multiplexing is used from the first transmit antenna to the $N_{\rm SM}$ -th transmit antenna and the CDD is used from the $(N_{\rm SM} + 1)$ -th transmit antenna to the N_t -th transmit antenna. Then, the MIMO transmit vector $\mathbf{X}_{\rm P}$ is as follows,

$$\mathbf{X}_{\mathrm{P}} = \begin{bmatrix} \mathbf{X}_{\mathrm{SM}} & \mathbf{X}_{\mathrm{CDD}} \end{bmatrix}^{T}, \tag{6}$$

where $\mathbf{X}_{SM} = \begin{bmatrix} X_{SM,1} & X_{SM,2} & \cdots & X_{SM,N_{SM}} \end{bmatrix}$ and $\mathbf{X}_{CDD} = \begin{bmatrix} X_{CDD,1} & X_{CDD,2} & \cdots & X_{CDD,N_{CDD}} \end{bmatrix}$ are transmit vector for the spatial multiplexing and CDD.

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From Equation (6), the MIMO received vector $\mathbf{Y}_{\mathrm{P}} = \begin{bmatrix} Y_{\mathrm{P},1} & Y_{\mathrm{P},2} & \cdots & Y_{\mathrm{P},N_r} \end{bmatrix}^T$ is as follows,

$$\begin{bmatrix} Y_{P,1} \\ Y_{P,2} \\ \vdots \\ Y_{P,N_r} \end{bmatrix} = \begin{bmatrix} H_{11} & H_{12} & \cdots & H_{1N_r} \\ H_{21} & H_{11} & \cdots & H_{2N_r} \\ \vdots & \vdots & \ddots & \vdots \\ H_{N_r1} & H_{N_r2} & \cdots & H_{N_rN_r} \end{bmatrix} \mathbf{X}_{P} + \begin{bmatrix} N_1 \\ N_2 \\ \vdots \\ N_{N_r} \end{bmatrix}.$$
(7)

By using Equation (4), the $Y_{\rm p}$ can be rewritten as follows,

$$\begin{bmatrix} Y_{P,1} \\ Y_{P,2} \\ \vdots \\ Y_{P,N_r} \end{bmatrix} = \begin{bmatrix} H_{11} & H_{12} & \cdots & \sum_{j=1}^{N_{CDD}} H_{1j} e^{-j\frac{2\pi k\delta_j}{N}} \\ H_{21} & H_{22} & \cdots & \sum_{j=1}^{N_{CDD}} H_{2j} e^{-j\frac{2\pi k\delta_j}{N}} \\ \vdots & \vdots & \ddots & \vdots \\ H_{N_r1} & H_{N_r2} & \cdots & \sum_{j=1}^{N_{CDD}} H_{N_rj} e^{-j\frac{2\pi k\delta_j}{N}} \end{bmatrix} \begin{bmatrix} X_{SM,1} \\ X_{SM,2} \\ \vdots \\ X \end{bmatrix} + \begin{bmatrix} N_1 \\ N_2 \\ \vdots \\ N_{N_r} \end{bmatrix},$$
(8)

where X is non-cyclic delayed original symbol.

From Equation (8), the hybrid transmission scheme does not require many receive antennas due to the composite channel property and it can be useful specially in MIMO downlink channel.

For signal detection in equation (8), the LR-aided ZF based on complex Lenstra-Lenstra-Lavasz (CLLL) algorithm is used for high error performance with low complexity. The general ZF detector may cause noise enhancements when the inverse matrix is multiplied by the received symbol. The LR-aided ZF can reduce these noise enhancements by approximating the channel matrix to the orthogonal matrix. By using equation (8), the Y_p can be rewritten as follows,

$$\mathbf{Y}_{\mathrm{P}} = \mathbf{H}_{\mathrm{M}} \mathbf{X}_{\mathrm{M}} + \mathbf{N} = \mathbf{H}_{\mathrm{M}} \mathbf{T} \mathbf{T}^{-1} \mathbf{X}_{\mathrm{M}} + \mathbf{N} = \mathbf{H}_{\mathrm{LR}} \mathbf{X}_{\mathrm{LR}},$$
(9)

where **T** is unimodular matrix for approximating the channel matrix to the orthogonal matrix, $\mathbf{H}_{LR} = \mathbf{H}_{M}\mathbf{T}$ and $\mathbf{X}_{LR} = \mathbf{T}^{-1}\mathbf{X}_{M}$ are new channel matrix and transmit symbols vector. To remove the inter antenna interference (IAI), \mathbf{H}_{LR} is multiplied by the \mathbf{Y}_{P} as follows,

$$\mathbf{H}_{\mathrm{LR}}^{-1}\mathbf{Y}_{\mathrm{P}} = \mathbf{X}_{\mathrm{LR}} + \mathbf{N}_{\mathrm{LR}},\tag{10}$$

where $\mathbf{N}_{LR} = \mathbf{H}_{LR}^{-1} \mathbf{N}$ is new noise vector.

Finally, the equalized symbols in Equation (10) go through quantizer and **T** is multiplied by the \mathbf{X}_{LR} to detect the \mathbf{X}_{M} .

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Simulation Results

This section shows the simulation results for the proposed hybrid transmission scheme in 4×4 MIMO-OFDM system. In this simulations, FFT size is 128 and guard interval (GI) size is 32. Also, the used modulation is 16-quadrature amplitude modulation (16-QAM) and the used channel coding is convolutional code which uses 1/2 code rate. Figure 2 shows the bit error (BER) performance of the conventional and the proposed scheme. In Figure 2, the BER performance of the proposed scheme is very higher than the conventional LR-aided ZF because the proposed scheme uses the CDD properly by using the channel environments effectively in accordance with the quality of channel.

Figure 3 shows the throughput of the conventional and the proposed scheme. In Figure 3, the loss of the throughput of the proposed scheme is shown compared to the conventional scheme at high signal to noise (SNR). However, the throughput of the proposed scheme is higher than the conventional scheme at low SNR because the proposed scheme minimizes the loss of the throughput by using the CDD properly according to the channel environments effectively.



Figure 2: The BER performance of the proposed scheme in 4×4 MIMO-OFDM system





Figure 3: The throughput of the proposed scheme in 4×4 *MIMO-OFDM system* **Conclusion**

This paper proposes the hybrid transmission scheme for high error performance in MIMO-OFDM systems which have poor error performance relative to high complexity at the receiver. Unlike the general spatial multiplexing schemes, the proposed hybrid transmission scheme uses the CDD when the estimated channel has poor quality to improve the error performance and minimize the loss of the throughput. At the receiver, the LR-aided ZF is used for low complexity. The simulation results show that the error performance of the proposed scheme has very higher error performance than the conventional spatial multiplexing scheme at low SNR due to efficient transmission mode in accordance with estimated quality of the channel.

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Qualitative Comparison of Supervised Learning Methods for the Classification of Electronic Components on PCBAs

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Abstract

The life cycles of current electronic devices are getting shorter due to the multitude of innovations, resulting in a significant amount of waste of electrical and electronic equipment (WEEE). This electronic scrap contains many valuable materials, in particular metals such as gold, silver, platinum or even tantalum. While some of them are already being recycled, there is still much room left for optimizations. One possibility in order to optimize the current recycling process of rare and valuable metals is the selective disassembly of certain components. This leads to a higher concentration of the desired substances, enabling an economical recycling.

In order to disassemble the components selectively, they have to be detected in the first place. A pilot plant with different sensors has been built for this purpose. The plant delivers preprocessed data, which is fed into feature extraction and classification routines.

Based on previous research this paper focuses on a comparison between two different feature-based methods and a state-of-the-art approach in the form of a convolutional neural network for detection and identification of electronic components containing valuable substances. The feature-based methods consist of a Random Forest (RF) classifier in combination with either a Principal Component Analysis (PCA) or a predefined feature descriptor.

Keywords: Machine Learning, CNN, PCA, Classification **Main Conference Topic:** Artificial Intelligence

Introduction

Over the past years, the amount of electronic devices per household has been increasing dramatically. Not only electronic appliances have become more affordable but also they are getting technologically more complex. This development, together with shorter product lifespans, is leading to an increasing amount of electronic waste. Every year over 40 million tons of e-waste are being generated globally (United Nations University, 2014). Besides the obvious negative impact on the environment, this also creates an opportunity for recycling valuable materials.

Especially on printed circuit board assemblies (PCBA) there are many valuable elements like gold and platinum, but also rare earth metals. However, the recycling of those can be challenging when the concentrations of the desired elements in the primary material are too low. A large percentage has not been recycled yet, because the process is too complex to be profitable. The common process of recycling PCBAs and obtaining the primary material



involves shredding the PCBAs by using large machine equipment. Thermal or chemical processes then separate the individual materials from each other. While elements like copper and gold can be extracted rather efficiently with this method, the recycling rates for other valuable materials such as rare earth metals are very low. For example tantalum, an element used for high performance capacitors, can hardly be recovered by using currently available solutions.

As many valuable materials are becoming increasingly scarce, the demand for innovative recycling solutions rises. As tantalum is difficult to substitute, the German federal government is planning to introduce a law for recycling tantalum. This legislative initiative drives the development of more refined recycling methods.

One approach to boost the recycling rates for tantalum and similar elements is the selective disassembly of specific electrical components on PCBAs. For this purpose, a pilot plant has been developed that aims at detecting and extracting specific types of components on PCBAs. In order to analyze the PCBAs, a set of sensors is used to scan the surface. The resulting 2D and 3D output data is processed using multiple algorithms to detect and classify individual components. This classification is performed using machine learning.

This paper aims at examining new approaches of supervised learning methods and comparing them based on their detection rates.

Current Setup, Database and Previous Work

In order to create a detailed database of PCBAs a setup with sensors is used. Those sensors are an industrial color camera and laser-line scanner, which are serially arranged above a conveyer belt. The PCBAs are transported past the sensors so that the recorded data can be preprocessed afterwards. As a first step, the data has to be undistorted, cut and synchronized in order to do a plane calculation with the help of the RANSAC algorithm. This is followed by a component extraction, which utilizes a BLOB algorithm. A more detailed consideration concerning those algorithms is described by Ruecker et al. (2016).

Subsequently the detection part begins with a feature extraction. The features that are used to describe the individual components are then utilized to train different algorithms for the classification of the components. A flowchart of the program is shown in Figure 1.



Figure 1: Flowchart of the program

From the accumulated electronic waste, high-quality PCBAs were combined into a database comprising 406 recordings or measurements of a total of 113 printed circuit boards. The individual PCBA-sides with components are each recorded in two orientations. If a tantalum capacitor was on one side, this side was recorded in all four orientations.

In order to create ground truth data the dataset has to be labeled at first. There are four different kinds of circuit board types that are Mainboards, GPUs, RAMs and Interfaces. To simplify the classification and yield the best results, the available component classes were limited to six. An additional class (Unclassified) was invented to cover all the other component types. All of the classes including their description and quantity are shown in Table 1.



Height

Component	Description	Quantity
Ta. Cap. yellow	Tantalum capacitors with a yellow package	191
Ta. Cap. black	Tantalum capacitors with a black package	770
Ta. Cap. orange	Tantalum capacitors with an orange package	55
Chip	Integrated circuits mostly in SMT	3422
Elec. Cap.	Aluminum electrolytic capacitors	1335
Quartz	Crystal oscillators	226
Unclassified	Components of other types	2673
	Total amount	8672

Table 1. Dreakaown of allerent component classe	Table 1:	Breakdown	of different	component	classes
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At first, different features have to be evaluated for achieving an automated classification of the components. The previously developed features describe distinctive characteristics of the color image and the height matrix. Table 2 lists the different features describing shape, overlapping and total area, color and the height of the individual components.

	1 (, , ,
Feature	Definition
Shape	Rectangular or circular shape
Area overlap	Ratio of component area to bounding box area
Total area	Total area of the component
Color	Average value of each RGB-channel

Average height of the component

Table 2: Feature descriptor (Ruecker et al., 2017)

For the component classification, all features mentioned above were combined into one descriptor function and transformed into a subspace for classification purposes. Based on the previous work the RF approach was the best classification algorithm in comparison to other traditional approaches. (Ruecker et al., 2017)

Applying the Random Forest Approach on Specific Features

Using a number of classification features, such as shape, size and color, already leads to high detection rates. However, the raw data from the color camera and the 3D line scanner are not used directly for the classification. The main reason is the low significance of single pixels or data points. The large amount of data would also lead to a considerably higher processing time. In order to resolve this problem, a method needs to be found for compressing the useful data into a limited number of features.

Principal Component Analysis is a statistical tool for simplifying large sets of data by reducing their dimensions to a small number of principal components. It is based on the diagonalization of the $(n \times n)$ covariance matrix of the *n*-dimensional coordinate space. The corresponding *n* eigenvectors (principal components) with the eigenvalues (variances) in descending order serve as new coordinates. Using PCA on the data, patterns in terms of similarities and differences can be identified while restricting the presentation to a lower dimensional subspace. To illustrate the algorithm, a two dimensional space with randomly distributed data points is shown in Figure 2. By applying PCA, a new coordinate system is defined. In this system the first axis or principal component pc₁ has the largest possible variance. The succeeding orthogonal component pc₂ has a lower variance. In this case, if pc₂



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is omitted, not much information will be lost. The same process can be applied to data in n dimensions.



Figure 2: PCA in a 2-dimensional space

In order to apply PCA to the problem of component classification, a uniform data format has to be created, including both the data from the 2D color camera and the 3D line scanner. To achieve this, image sections including each electrical component are scaled to a 16 x 16 pixel image. The color images are then split into their color channels in order to create three monochrome images. A fourth image is added, consisting of a 16 x 16 height map. Afterwards, the four matrices are converted into a single row vector containing 1024 values. To ensure PCA can work correctly, the mean of the entire set of data must be zero. This is done by calculating a mean image from the data set, which is then subtracted from each entry. PCA is then performed on the data using the Waikato Environment for Knowledge Analysis (MLG Waikato, 2016). The resulting set of coefficients is then used to calculate multiple classification features.



Figure 3: PCA feature creation

As an alternative to the independently applicable PCA method, improvements are also possible by extending the existing feature descriptor. This step enables a more precise characterization of different components. For this purpose, eight new features of medium complexity are added to the initial descriptor of size seven. Table 3 describes those additional features.

Feature	Definition
Major axis	Longest placable axis within the component
Minor axis	Shortest placable axis within the component
Eccentricity	Value ranging from 0 for circle to 1 for line
Perimeter	Pixelwise perimeter of the component
Height STD	Standard Deviation of the components height values
Color STD	Standard Deviation of each RGB-channel

Table 3: Descriptor extension by eight new features

To evaluate the quality of PCA and descriptor features, the RF classifier is appropriate. The RF is an exceedingly fast classification algorithm composed of various Decision Trees (DT). A single DT observes the ability of given features to separate the data. Depending on each feature's ability, the tree grows in its structure. Using this strategy, a RF creates a variety of DT's by randomly distributing different parts of the dataset and the feature

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descriptor. In order to conclude a mutual result of the RF, the result of each DT is treated like a vote given in an election. (Breiman, 2001)

Convolutional Neural Network

The nowadays highly popular Convolutional Neural Network (CNN) (Krizhevsky, Sutskever & Hinton, 2012) was proposed due to the rising challenge of minor error rates in image classification. This network is trained by supervised learning with vast data sets in order to classify a diverse amount of different real world objects while achieving a very small error. In contrast to the usual Artificial Neural Network (ANN), CNNs consist of several differing types of layers (e.g. convolution, maximum pooling and rectifier). The architecture of a CNN can be modified easily and hence is adaptable to any particular problem. A slight drawback of this method emerges in concerns of the necessity of huge computational power and likewise a training period ranging from days to weeks even if using a modern Graphics Processing Unit (GPU).

Besides the basic image classification where the kind of object in an image is identified, there is also a more sophisticated approach detecting simultaneously if and where objects of interest out of a predefined class are located in an image. The Region Based CNN (R-CNN) (Girshick et al., 2014) is capable of creating bounding boxes surrounding classified objects. The R-CNN consists of two main components, namely the extraction of region proposals followed by the application of a CNN. Initially, the region proposal method is applied to create positive and negative input data for the CNN. An algorithm (Zitnick & Dollár, 2014) tries to find interesting regions in a given image using recognized edges and contours. Usually about 2000 region proposals are created for a single image. However, in case of PCBAs this algorithm is not appropriate to extract the regions containing components. Thus, in this work a sliding window approach with variable sizes was applied to the whole image, yielding about 10⁶ region proposals. These proposals are then compared with the original ground truth bounding box data. Depending on the ratio of overlap to the ground truth, the proposals are either treated as positive training examples or negative examples. The corresponding region proposals are then resized to a uniform size (e.g. 32 x 32) representing the input samples for the CNN.



Figure 5: Schematic of evaluated CNN architecture

Figure 5 depicts a simplified illustration of the CNN architecture used in this work. From step to step, the CNN tries to reach a higher level of abstraction in order to find its own unique features for any sought class. The convolutional layers consist of trainable filters (e.g. 7 x 7), which move through their actual input matrix. This step leads to a smaller output matrix but also allows a steep increase of spatial dimensions. The three exemplary dimensions from an RGB image can thus be convoluted to a multidimensional matrix. Maximum or average pooling layers are also using a sliding window of particular size to evaluate either maximum or mean values therein. These values are then inserted in a new,



regarding theory is described by Girshick et al. (2014).

even smaller matrix. A rectified linear unit (ReLU) represents one kind of nonlinearity, which is basically an ordinary ramp function. Towards the end of the network, fully connected layers can take advantage of the previously prepared high level features. The functionality of fully connected layers corresponds to a traditional multilayer perceptron. A softmax nonlinearity with outputs ranging from 0 to 1 followed by a cross entropy loss function for multi class problems conclude the classification result of the network. The training process itself is performed by usual backpropagation. After the classification, a bounding box regression is applied to refine the final positions for object detection. Further information

Classification Results

The results are based on a data set containing a total of 8672 components with two thirds being used for training and the remaining third for testing. Using the first five PCA based features, a detection rate of 80.7 % was achieved. Although integrated circuits and electrolytic capacitors were classified with high accuracy as shown in the left side of Table 4, the detection rates for tantalum capacitors were below expectations.

In contrast the predefined features yield a very high detection rate of 95.3 %, which can be seen in an overall reduction of false classifications for every class. Compared to the original feature vector (Ruecker et al., 2017) the appended descriptor yields a 4.1 % higher detection rate.

Table 4: Confusion matrices for RF detection using PCA (left) and predefined features (right)

a	b	с	\mathbf{d}	\mathbf{e}	\mathbf{f}	\mathbf{g}	a	\mathbf{b}	с	\mathbf{d}	\mathbf{e}	\mathbf{f}	\mathbf{g}	Component
32	2 0	2	0	0	3	38	69	0	3	0	0	0	3	a = Ta. Cap. yellow
0	122	0	118	0	0	15	0	239	0	12	0	0	4	b = Ta. Cap. black
4	0	0	0	0	1	9	2	0	12	0	0	0	0	c = Ta. Cap. orange
0	42	0	1032	5	0	39	0	8	0	1083	5	0	22	d = Chip
0	0	0	3	419	0	36	0	0	0	2	446	1	9	e = Elec. Cap.
1	4	1	2	1	46	36	0	5	0	2	0	69	15	$\mathbf{f} = \mathbf{Q} \mathbf{u} \mathbf{a} \mathbf{r} \mathbf{t} \mathbf{z}$
18	8 27	1	89	63	11	728	0	8	0	27	5	5	892	$\mathbf{g} = \mathbf{Unclassified}$

While the previous methods produced results in terms on detection rates, the developed CNN in its current state only provides classification results in images (Figure 6). These images were manually assessed for their quality. Depending on the size of the detected boxes, matches greater than 50 % are treated as positive detection results. In consideration of the required huge data set the whole database was needed for training. As a consequence a legacy data set had to be used for the testing process. This data set consists of 82 recordings of PCBAs, mostly with chips and electrical capacitors. However, the test set does only include 27 black, five yellow and zero orange tantalum capacitors. This fact severely limits the significance of the final detection rates for the tantalum capacitors, which can be seen in Table 5.

As already explained, the proposed CNN evaluates images in a sliding window approach yielding several region proposals. Region proposals of the detected type unclassified are treated as background. The exact amount of unclassified samples exceeds 10^7 and is represented as X.



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	' '			

a	b	с	d	e	f	Component
1	0	0	0	0	4	a = Ta. Cap. yellow
0	11	3	0	0	13	b = Ta. Cap. black
0	1	500	3	1	22	c = Chip
0	0	1	291	0	42	d = Elec. Cap.
0	0	1	1	17	4	e = Quartz
5	31	173	55	15	\mathbf{X}	f = Unclassified

Table 5: Confusion matrix for CNN detection



Figure 6: Exemplary CNN result

As can be seen in Figure 6, the CNN already yields satisfying results. Due to the nature of the algorithm some components within the image were classified multiple times leading to overlapping bounding boxes of the same type.

Conclusion

This paper proposes the comparison between two different feature-based methods and a state-of-the-art approach in the form of a convolutional neural network for classifying electrical components on PCBAs. For this purpose, a PCA-based approach was implemented in order to gain more significant features for the classification and furthermore, to test a classification based on unprocessed raw data from the sensors. The PCA method made it possible to compress the large amount of input data into a limited set of features. By using the PCA based features in combination with the RF, a detection rate of 80.7 % was achieved.

A more promising approach is the classification of predefined features based on the components' axes, eccentricity, perimeter, the standard deviations and features of previous research as well. In contrast to PCA, this method yields a much higher detection rate of 95.3 %.

A completely different method is the application of a CNN. The CNN is a highly sophisticated supervised learning algorithm which works with unprocessed 2D color images. This first approach yields promising results, however, it depends on either huge computational power or computing time. Thus, unlike the other methods mentioned in this paper, its real-time capability is limited. A way to cope with this drawback of CNN would be to apply a CNN only to specific image regions identified by a 3D sensor. Another possibility to optimize the results might be to combine 2D and 3D data as an input for the CNN.

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Gait kinematics evaluation of adolescent scoliosis using machine learning algorithms

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Abstract

Introduction

Scoliosis is the deformity of the spine that translates laterally with twist at the central axis of rotation. This disorder frequently appears in adolescent because growth rate of musculoskeletal system is very rapid in this age. There are many studies covering the early detection of scoliosis with gait analysis. Although camera-based system is commonly used today, it carries drawbacks in its costly equipment and lack of its professional manpower.

The purpose of this study is to verify the difference between adolescent idiopathic scoliosis patients and age-matched controls applying the gait analysis by simpler and more economical method, IMU(inertial measurement unit) and machine learning algorithms.

Method

12 adolescent idiopathic scoliosis patients and 12 age-matched normal subjects were selected for this study. Total of 24 subjects were classified using machine learning by IMU-based kinematic parameters, which was calculated from 9 different gait patterns by sagittal, frontal, transverse plane at hip, knee, ankle joint areas.

Data-set was organized based on the kinematic parameters, and 9-dimension base classification was applied using kNN(k-Nearest Neighbor) classifier. The training consisted of 80% of training set and 20% of validation with cross-validation 5 fold. Re-training was also performed by transferring 9-dimension to 2-dimension, using PCA(Primary components analysis)

Results

When classified with kNN, it showed 91.2% of accuracy, and showed 94.1% of accuracy with PCA. The parameters contribution ranking to the machine learning classification is knee internal/external rotation, hip flexion/extension, and hip internal/external rotation in order.

Conclusion

We could conveniently measure the kinematic gait analysis of adolescent scoliosis patients with IMU based gait analysis system, and efficiently organized and classified the parameters using the machine learning methods.

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We expect constant study of proper sample size with machine learning methods will result in more accurate evaluation of type and severity of scoliosis and even prediction of the possibility of scoliosis.

Keywords: Gait analysis, Scoliosis, Machine learning, Rehabilitation **Main Conference Topic:** Artificial Intelligence and Information Technology



Developing of sentiment multi-classifier for natural language texts

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Abstract

The paper presents the approach to development of classification system of natural language texts emotional perception. The proposed multidimensional emotional model for the text sentences estimate that makes possible to identify a wide spectrum of basic human emotions is the principle difference from standard approaches in the sentiment-analysis domain. The efficiency and correctness of the proposed model are confirmed by results of experiments

Keywords: Sentiment Analysis, Emotions Identification, Textual Emotion Detection, Machine Learning, Assessment

Main Conference Topic: Artificial Intelligence

Introduction

The sentiment-analysis of texts is one the most popular and classical problems for natural language processing. In the context of this problem the research was being carried on for decades and has resulted in the state-of the art sentiment-analysis systems (Socher et al., 2011), (Socher et al., 2012), (Socher et al., 2013), (Wang et al., 2012).

The classical sentiment-analysis is a text fragment classification according to its emotional component, i.e. how it is treated by the author of the text and the type of emotions it excites at the reader. As a rule, the text fragment evaluation was performed by the scale "negative-neutral-positive". The more sophisticated and different emotions identification has always been a task complex enough that demanded text processing more complicated including semantic analysis elements realisation. Therefore development of multi-sentiment analysis systems was rather the purpose and the task for scientific researches and for real research&development projects aimed at practical application systems for business.

The authors of this article propose multidimensional model for emotional marking and evaluation of natural language texts. This model considers a wide spectrum of human emotions such as joy, respect, empathy, fear, hatred etc.

According to the developed model experts marked the text corpus which subsequently was used for learning of the system that was implemented on the basis of machine learning models. The Naïve Bayes model, the Linear regression model and Support vectors machine were employed in various versions and configurations.

Series of experiments for the model's efficiency and correctness determination were conducted. A cross-validation technique with learning and checking of sentiment-classifiers precision was exploited there.

The obtained results confirm the perspective of the proposed model and the approach in the whole.



2. The development of the emotions sample set

The next emotions were chosen as basic for multisentiment-classifiers:

- A aggression, hatred
- B fear
- C sympathy, positive attitude
- D-envy
- E discontent, antipathy
- F despair
- G pity
- H-horror
- I astonishment
- J-indignation
- K irony
- L agitation, anxiety
- M irritation
- N regret
- O joy
- P psychic income
- Q calming
- R-sarcasm
- S-disappointment
- T-confidence
- U alertness
- V despondence
- W feeling of ignorance, transient in apathy

The letter in the beginning of the line indicates the class code. It is used in the text marking.

3. The development of marked texts corpus

To obtain texts training set for classifiers learning the corpus of English politicallyoriented papers was marked. It contains texts in the amount of about 1000 from websites of mass-media such as The Guardian, The BBC, The telegraph, Euronews, France24, Deutschewelle, Tass, Russia today, Sputnik, Bloomberg, The CNN, The New York Times.

The XML-like code was used for marking.

A text fragment that contained some emotion or that was giving rise to some emotion was marked out and after that the fragment was marked with the corresponding letter. Each corpus text was marked by three experts as minimum. Only the fragments that coincided in their class name assigned by three experts were selected in the final version of marked texts.

4. The development of classifiers

To form the emotions classifiers the next models of machine learning were used in the texts:

- Linear regression

- Linear SVM

- SVM with radial basis kernel
- SVM with histogram intersection kernel



A library sklearn.py for the Python programming language was used.

5. Features set for machine learning classifiers

The feature extractors for the following features were realised:

- 1. Unigrams;
- 2. Bigrams;
- 3. Trigrams;
- 4. Unigrams from synonyms of original unigrams;
- 5. Bigrams from synonyms of original bigrams;
- 6. Trigrams from synonyms of original trigrams;
- 7. Unigrams of words from the nearest neighbours-synsets in the WordNet;
- 8. Bigrams of words from the nearest neighbours-synsets in the WordNet;
- 9. Trigrams of words from the nearest neighbours-synsets in the WordNet.

Measures of semantic proximity developed in the models of machine translation are also used:

10. BLEU (Papineni et al., 2002)

$$BLEU(r,c) = BP(r,c) \times exp\left[\sum_{n=1}^{N} \frac{1}{N} \times \log(p_n(r,c))\right],$$
(1)

where N is the maximum n-gram size. The n-gram precision p_n is given by:

$$p_n(r,c) = \frac{\sum_{x \in NGrams_n(c)} count(x, NGrams_n(r) \cap NGrams_n(c))}{\sum_{x \in NGrams_n(c)} count(x, NGrams_n(c))}, \quad (2)$$

where *count* (x, X) is the count of element x in set X.

11. BLEU, where sequences of meaningful words are used for N-grams, that is: IDF(x, docs) > L,

where IDF is the abbreviation for the Inverse Document Frequency:

$$IDF(x, docs) = log\left(\frac{|docs|}{|docs|_{x \in docs|}}\right);$$
(4)

docs – corpus of documents; L – a certain threshold depending on the peculiarities of document corpus.

12. BLEU, where sequences of syntax N-grams are used.

- 13. NIST (Doddington, 2002).
- 14. METEOR (Denkowski, 2010).

15. BADGER (Parker, 2008).

6. Experiments

The experiments for determination of the efficiency and correctness of designed classifiers were held according to cross-validation principles when the learning was performed on the one part of the marked corpus. Computing of precision and recall assessments for recognition of fragments containing emotions and the appropriate class designation was performed on the another part of the corpus that wasn't proceeded before. In this case the obtained results may be compared to sample marks. After that learning part and checking part of marked corpus substitute each other, and learning and checking process repeats. We select minimum values of the obtained assessments of precision and recall for found solutions as guaranteed ones. The results of conducted experiments for selected emotions are given in the Table 1, and realized classifiers are presented.

Label	Count 25492	Linear SVM	SVM with radial basis kernel	SVM histogram intersection kernel	Linear SVM with WordNet features
Α	99	62,35%	61,12%	73,29%	94,61%
В	76	66,36%	66,79%	75,02%	45,38%
С	319	0,00%	49,99%	62,24%	80,14%
Ε	487	0,05%	8,76%	38,76%	1,32%
F	35	28,57%	62,32%	79,55%	0,00%
G	72	12,50%	63,47%	71,73%	14,27%
Н	61	74,97%	57,21%	72,70%	92,80%
Ι	60	66,04%	57,53%	66,20%	95,97%
J	191	53,61%	62,24%	67,15%	29,45%
K	38	69,35%	79,11%	70,64%	19,76%
L	228	57,42%	55,30%	61,54%	63,76%
Μ	84	58,56%	64,12%	66,66%	74,86%
Ν	57	67,69%	56,43%	68,73%	79,14%
0	35	78,63%	67,66%	72,70%	100,00%
Ρ	70	70,29%	63,21%	64,06%	95,80%
Q	43	76,15%	65,15%	72,85%	29,58%
R	33	68,77%	64,37%	80,21%	98,11%
S	82	63,86%	62,56%	63,70%	93,38%
Т	51	69,82%	71,87%	71,66%	35,37%
U	157	60,09%	50,97%	62,52%	28,60%
V	52	58,37%	55,33%	66,06%	64,30%
\mathbf{W}	34	73,73%	56,01%	69,41%	66,25%

Table 1: Results of conducted experiments

We can see from the obtained data that different classifiers process emotions in a different way. SVM with linear kernel detects better such emotions as calming, indeterminacy and feeling of trust. SVM with radial basis kernel detects better irony and confidence. SVM with histogram intersection kernel identifies the best such emotions as fear, envy, antipathy, discontent, despair, pity, indignation, alertness and despondence. SVM with linear kernel exploiting the nearest WordNet sinsets words identifies the best aggression, hatred, sympathy, positive attitude, horror, astonishment, alertness, anxiety, irritation, regret, joy, moral satisfaction, sarcasm and disappointment. It is obvious that using of double-level classifiers ensemble in future research is the most expedient. In this case realized first-level classifiers are complemented by super-classifier that will be learned to calculate the final solution on the basis of solutions of first-level classifiers.

7. Conclusion

Therefore, the proposed multidimensional emotional model for text sentences evaluation is the principal difference from standard approaches in the sentiment-analysis. Its exploitation makes possible to identify a vast scope of basic human emotions in the system Moren

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for classification of natural language texts emotional perception. The experimental results cited in this paper confirm the efficiency and correctness of the developed model.

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A Comparison of Extended Space Forests for Classifier Ensembles on Short Turkish Texts

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Abstract

The proliferation of text documents available on the different digital platforms has attracted the attention of many researchers due to the classification problems. In order to boost classification success, they focus on parsing of documents, tokenization, stop-words removal, stemming, and representation of documents in convenient forms and weights, selection of features and classifiers, training and testing phases. In this study, we center on classifier ensembles with extended space forests by enriching feature space with various feature selection techniques in text categorization domain. For this purpose, original feature space is enhanced with random combinations of features and significant features which have high classification capacity by using gain ratio as a feature selection technique. Then, the training procedure is carried out with the well-known classification algorithm, namely naïve Bayes and various ensemble algorithms such as Bagging, Random Subspace and Random Forest. A wide range of comparative experiments are conducted on short Turkish texts gathered from Turkish National News Agency to demonstrate the contribution of our work. Eventually, experiment results represent that the versions of enhanced space forest perform better classification accuracy than the usage of original feature spaces on Turkish texts.

Keywords: Classifier Ensembles, Extended Spaces, Random Forest, Random Subspace, Bagging, Naïve Bayes, Text Classification.

Main Conference Topic: Machine Learning, Ensemble Learning, Artificial Intelligence.

Introduction

Text classification has always been a popular research area due to the proliferation of text documents available in digital platforms. One of the challenging problem is based on classification of a given document into one of predefined categories by employing generally supervised machine learning techniques such as naïve Bayes (NB), k-nearest neighbors (k-NN), decision trees (DT), artificial neural networks (ANN) and support vector machines (SVM). Parsing of documents, tokenization, stop-words removal, stemming, and representation of documents in suitable forms, selection of features and classifiers are fundamental processes for the text categorization.

Furthermore, ensemble learning is a substantial research topic in the literature recently. Ensemble learning has also known as committees of learners, mixture of experts, ensemble of classifiers, ensemble algorithms [1-4]. The idea behind of this approach is to use more than one classifier. Thus, it is expected to generate more accurate and robust models by classifying [5-8]. Generally, classification task is implemented by supervised machine learning



techniques as mentioned above. Each learning technique is called base or individual classifier (learner). At training phase, each individual classifier is trained separately on a given training dataset. Ensemble generation and aggregation (integration, fusion) are the basis of ensemble strategy. It is proposed to create diverse base classifiers at the generation step to provide diversity by means of various ensemble algorithms. Aggregation part is another important step to obtain a final decision of ensemble system by evaluating outputs of each base learner.

In addition to the selection of classifier, individual success and diversity of base learners are determinative parameters of the ensemble performance. The more classifier ensembles get diverse base learners, the more the overall classification accuracy will be better. Thus, it is essential to generate diverse base learners by making use of different or same base learners. Diversity can be provided by usage of different training datasets if base learners are the same. In order to get different training dataset, there are several traditional ensemble algorithms such as bagging, boosting, random subspaces, random forests, and rotation forests. There has been a limited research on the use of ensemble systems on text categorization domain. In this paper, we aim to investigate the classification success of ensemble algorithms on Turkish text documents. Extensive experiment results demonstrate that extended space forests with ensemble learners boost the classification performance effectively compared to the original feature space with the single classifiers on text categorization field.

The rest of the paper is organized as follows: Section 2 gives related researches on the utilization of ensemble systems on text categorization. Section 3 presents base learners and ensemble techniques employed in experimental studies. Experimental setup and results are given in sections 4 and 5. Section 6 concludes the paper with a discussion.

Related work

In this part, we review some of research that exploits ensemble techniques for text categorization and enhanced space forest approach. Authors in [9] carry out ensemble techniques to multi-class text documents where each document can belong to more than one class. They implemented the performance of ensemble methods by using multi-label learning algorithms. H. Elghazel et al. [10] demonstrates a novel ensemble approach including multi-label text categorization, called Multi Label Rotation Forest (MLRF) that utilizes a consolidation of Rotation Forest and Latent Semantic Indexing.

In a recent study [11] empirically measures the predictive performance of the ensemble learning techniques on text documents that are demonstrated keywords. They first perform various keyword extraction algorithms namely, most frequent measure based keyword extraction, term frequency-inverse sentence frequency based keyword extraction, and co-occurrence statistical information based keyword extraction, eccentricity-based keyword extraction and text rank algorithm to test dataset. Then, they use learning algorithms (naïve Bayes, support vector machines, logistic regression and random forest) with commonly used ensemble methods such as adaboost, bagging, dagging, random subspace, majority voting. They accomplish study that keyword based representation of text documents with ensemble learning techniques can advance the predictive performance.

The other study [2] affirms the extended feature space by picking new features up randomly and attaching them to original feature space. Different feature generating operators (sum, divide, difference, multiply, etc.) are implemented to generate and join new features to



the original feature space. The difference operator is determined as the best operator by evaluating averaged individual accuracy of base learners, average accuracy ranks, and average kappa of base learners. A new extended feature space is composed of d number of original features and d number of new features. Training procedure is implemented 100 times which points out the number of base learners and 10-fold cross validations are applied for each dataset and ensemble algorithm. Experiments are carried out on 36 UCI dataset which is publicly available and commonly used. They conclude the study that usage of extended space approach for classifier ensembles boosts the classification capacity compared to the original ones.

Recent studies [3, 12] on extended space decision trees propose to advance the ensemble accuracy by recommending an approach. New features with high classification capacity to be joined to the original feature space are generated by scoring the gain ratio of each different feature. A decision forest is constructed on the extended feature space at the training phase and experiments are performed on datasets that are collected from the UCI Machine Learning Repository. Experiment results demonstrate that the usage of features which have high classification capacity on extended feature space can raise the classification success of the ensemble system.

Another recent study [13] aims to analyze the efficiency of enhanced random subspace technique based upon part-of-speech method, POS-RS, for sentiment categorization domain. For this purpose, authors use two substantial parameters namely, content lexicon subspace and function lexicon subspace rate by means of POS-RS technique to create diversity among individual classifiers. Experiments are implemented on sentiment datasets to show the effectiveness of their technique. They conclude that POS-RS method enhances the classification performance of system.

Base learners and ensemble techniques

Base learners of ensemble system and ensemble methods employed in our experiments are mentioned briefly in this part. Due to its classification success, multinomial naïve Bayes algorithm (MNB) is picked out as a base learner compared to the other supervised machine learning algorithms such as multivariate Bernoulli naïve Bayes (MVNB), support vector machines (SVM) and decision trees (DT). After determining the classification algorithm, different ensemble techniques, namely bagging, random subspace, and random forest are exerted.

A naïve Bayes classifier is a simple probabilistic classifier that bases on Bayes' theorem with independence assumption of features. There are two commonly used models of naïve Bayes which are multivariate Bernoulli naïve Bayes (MVNB) and multinomial naïve Bayes (MNB). While MVNB employs the occurrence of the terms in binary vector is referred as one, otherwise zero, MNB utilizes term frequencies which are represented by a vector of term counts. The class conditional probability of the term wt in class cj is given by multinomial distribution (using Laplace smoothing) [14]:

$$P(w_{t} \mid c_{j}) = \frac{1 + \sum_{i=1}^{|D|} N_{it} P(c_{j} \mid d_{i})}{|V| + \sum_{s=1}^{|V|} \sum_{i=1}^{|D|} N_{is} P(c_{j} \mid d_{i})}$$
(1)

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where |V| is vocabulary (total number of terms), N_{it} is the number of the count of times term w_t occurs in document d_i .

Bagging is one of the most popular and widely used ensemble algorithm [19]. Data diversity is acquired by means of resampling in which different training data subsets are randomly constituted with substitution from the whole training dataset. Each subset is utilized to train a different learner in the set of ensemble learners. Ensemble system is achieved final decision by means of majority voting aggregation rule.

Random subspace (RS) is similar to bagging but a random subset of features is chosen from the dataset instead of instances [15, 16]. Sampling is reiterated k times to obtain k different feature subsets to include a large portion of features in the original dataset. Thereafter, training procedure is performed with the k number of base learner and feature subset. The final decision is also ensured by aggregating decisions with majority voting.

Random forest approach is proposed by Breiman [17]. It is a collection of decision tree classifiers and proposes to associate Bagging and Random subspace methods. This procedure maintains extra randomness and ensures to avoid overfitting.

Experiment Setup

Aahaber¹, gathered by Tantuğ [18], is a dataset consists of concise newspaper articles broadcasted by Turkish National News Agency, Anadolu Agency. It comprises eight categories and 2,500 documents for each category. Categories are Turkey, world, politics, economics, sports, education science, "culture and art" and "environment and health". An infrequent term whose document frequency is less than three is implemented as a preprocessing step. We don't perform any stemming or stop word filtering to avoid any bias that can be introduced by stemming algorithms or stop-word lists.

Experiments are carried out by modifying the training set size that use 80%, 50%, 30%, 10%, 5% percentages of the data for training with repeated holdout method and the rest for testing. These percentages are demonstrated with "ts" abbreviation to avoid confusion with the accuracy percentages. The holdout is applied 10 times on each dataset. Moreover, the classification performance of ensemble system is evaluated thereby changing the number of base learners which ranges from 10 to 150. Due to its superior success, it is set to 100 for demonstrating remaining experiment results. We carry out experiments on the original d number of features and add d number of new features to the original feature space with feature selection methods by inspiring from the previous studies [2, 3, 12]. Eventually, ensemble accuracies are employed as an evaluation metric to compare with the results of studies represented in the literature.

Experiment Results

In first instance, we investigate the classification performance of supervised machine learning algorithms namely, multivariate Bernoulli naïve Bayes (MVNB), multinomial naïve Bayes (MNB), support vector machines (SVM), Random Forest (RF) to determine the base classifier of ensemble system.

¹ www.aa.com.tr



Table 1 indicates the classification accuracies of the base learners at different ts percentages mentioned in section base learners and ensemble techniques: two versions of Naïve Bayes classifier, namely, MVNB and MNB, Support Vector Machines, and Decision Tree. The classification performance of MNB outperforms other base learners as plainly seen below. It is considerable to point out that the classification success of MNB is obviously better at smaller training set percentages and accuracy values are much closer at higher training set levels. There is a slight difference among event models of naive Bayes especially at ts80 and ts50 but they perform superior classification accuracies approximately 3% - 4% improvement compared to the others. As training procedure is carried out at lower training set percentages, slight difference between the classification success of two models of naïve Bayes increases and the MNB demonstrates overwhelming superiority in proportion to other base learners. Furthermore, determination of the decision tree as a base learner will not be a good choice in terms of classification performance because of the lowest accuracy values. Eventually, the classification success order of the base learners is ordered as MNB > MVNB > SVM > DT and MNB is picked out as a base learner to pass through other phases of ensemble system.

TS	MVNB	MNB	SVM	DT
80	82.70±1.07	82.80±0.93	79.62±1.12	79.13±1.43
50	81.10±0.96	81.96±0.76	78.83±1.24	78.21±1.20
30	79.96±1.24	80.45±1.04	77.50±0.88	77.42±0.92
10	74.60±1.36	76.18±0.87	73.46±1.10	72.80±0.98
5	69.12±0.95	72.40±1.25	69.50±1.38	67.91±1.40

Table 1: The classification accuracies of base learners at all training set percentages

Feature space extension is significant part to demonstrate the contribution of our study. The main idea is based on to extend original feature space with various feature selection techniques. In this study, we focus on two different versions of extended space forests for text categorization. First one is composed from the random features of original feature space and second one is based upon the selection of features which have high classification capacity by using gain ratio technique which is proposed by in [3, 12]. Finally, new features which are picked up with feature selection methods are combined with the original features and the new extended feature space is constructed.

After the construction of extended feature space, ensemble algorithms (bagging, random subspace, random forest) are employed to diversify the training dataset and extended space forests with classifier ensembles are obtained that use multinomial Naïve Bayes model as a base classifier for all training set sizes.

Table 2 presents the average classification accuracies of extended space forests in terms of ensemble algorithms and deviation from the average by performing ten repetitions of the holdout method at all training set percentages. Abbreviations are employed for the ensemble algorithms and feature selection techniques as follows: BG: Bagging, RS: Random Subspace, RF: Random Forest, X_{GR} : Extended version of the dataset with gain ratio for X ensemble algorithm, X_{RD} : Extended version of the dataset with random features for X ensemble algorithm, Ts: Training set percentage and MNB, multinomial naïve Bayes, reflects the classification success of base learner with original space version.



From the perspective of the performance of ensemble algorithms, the order of success is the same for extended space forests that are both randomly and with gain ratio: RF > RS > BG. While RF_{GR} is the most successful community algorithm in all training set sizes, BG_{RD} has the lowest accuracy values among extended space forest techniques. Nevertheless, BG_{RD} is even better when compared to the classification performance of base learner (MNB). This is evidence of the contribution of extended space forests to the classification success. When the classification success is evaluated in terms of feature space extension techniques, the best classification success is mostly achieved by the gain ratio technique, followed by the randomly extended feature space method. In that case, the classification success of feature extension techniques and original feature space can be summarized in the following order: GR > RD > Original.

TS	MNB	BG _{GR}	RS _{GR}	R F _{GR}	BG _{RD}	RS _{RD}	RF _{RD}
80	82.80±0.93	83.75±0.72	85.42 ± 0.85	88.12±0.92	83.42±0.43	83.70±1.40	84.18±0.73
50	81.96±0.76	82.37±1.26	84.16±0.99	87.55±1.20	82.14±0.78	82.40±0.95	83.57±1.09
30	80.45±1.04	81.50±0.94	83.47±1.24	86.06±0.77	81.33±1.66	81.52±1.13	82.90±1.48
10	76.18±0.87	76.84±1.06	79.32±1.12	81.24±1.01	76.42±1.21	77.50±2.14	78.63±2.27
5	72.40±1.25	72.88±1.36	76.59±2.44	77.91±1.33	72.57±1.90	74.10±1.36	75.29±1.77

 Table 2: The classification accuracies of extended space forests in terms of ensemble algorithms at all training set sizes

When all extended space techniques, ensemble algorithms, and a base learner of the system are viewed from a wide perspective, the classification success is as follows: $RF_{GR} > RS_{GR} > RF_{RD} > RS_{RD} \sim BG_{GR} > BG_{RD} > MNB$. As we mentioned before, the classification performance of extended space forests, which are mostly extended by the gain ratio, outperforms others. It is also clearly observed that RS_{RD} and BG_{GR} only vary in terms of accuracy values at ts10 and ts5, and RS_{RD} is better than BG_{GR} at smaller training set percentages.



Figure 1: Classification performances of extended space forests in terms of the number of base learners

In Figure 1, it is obviously seen that the number of base learners which vary from 10 to 150 is also significant measure to observe the classification accuracies of extended space forests. When the number of base learners is raised up to 100, the accuracy values also boost for each extended space forest method. However, as the number of base learners continues to increase after 100, the classification success considerably decreases as inversely proportional.

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For this reason, it is determined as 100 in experiments and these results are consistent with the literature [2, 3].

Conclusion

It has been acknowledged that the ensemble learning and the extended feature spaces have increased the classification success of system. For this purpose, our work is revolved on the extended space forests with classifier ensembles in text classification domain. In addition, this work is based on that it is the first study to employ the Turkish dataset which is an agglutinative language and realize these two approaches in the field of text classification.

Initially, the classification performances of individual classifiers are analyzed to determine a base learner which provides the best classification success. Multivariate Bernoulli naïve Bayes (MVNB), multinomial naïve Bayes (MNB), support vector machines (SVM), and Decision Tree (DT) are utilized as supervised machine learning algorithms. After determining base learner as a MNB, feature space extension is performed with features selection techniques, namely randomly selected and gain ratio method. The features picked out by these methods are consolidated to the original feature space and the new extended feature space is obtained to construct the ensemble system. Training phase is carried out with MNB algorithm according to the ensemble methods, namely bagging, random subspace, random forest which provides data diversity. Experiments are conducted on short Turkish texts gathered from Turkish National News Agency to show the contribution of our work. Eventually, experiment results observably represent that the versions of extended space forests advance the classification success of system on Turkish texts and encourages the researchers to evaluate the impact of extended space forests with classifier ensembles on the other agglutinative languages.

The classification success of the ensemble algorithms with extended versions of the feature space is ordered as: RF > RS > BG. Among feature extension techniques, gain ratio exhibits better classification performance compared to the randomly picked up features. Thus, it can be summarized in the following order: GR > RD > Original. When the whole is evaluated, the classification success is as follows: $RF_{GR} > RS_{GR} > RF_{RD} > RS_{RD} ~ BG_{GR} > BG_{RD} > MNB$. When all results are evaluated, the combination of random forest as an ensemble algorithm and gain ratio as a feature extension technique is the best choice to advance the classification success of system. Additionally, the classification performance of ensemble algorithms and extended space forests, execution time analysis is processed in terms of testing and training times. There is a need for more training time due to extended feature space compared to the original feature space. For this reason, experiments are carried out on as short texts as possible.

Consequently, the usage of extended space forests for classifier ensembles boosts the classification performance of system on Turkish texts. As a future work, we plan to construct extended space forests for heterogeneous ensembles that utilize different types of base classifiers.

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Multidisciplinary Academic Conference

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Multi-criteria inventory classification using fuzzy AHP and SAW

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Abstract

Inventory classification can help an organization to maintain optimum inventory levels and determine the suitable ordering policies to be able to meet its requirements. Since it is seen that conventional ABC analysis is not sufficient for inventory classification, this study proposes approach includes the methodologies of fuzzy AHP (analytic hierarchy process) and SAW (simple additive weighting) for classifying inventory. This study is carried out in a municipality for obtaining an ABC classification system. It is expected that provide improving business efficiencies and lowering the costs.

Keywords: inventory classification, multi-criteria decision making, fuzzy AHP, SAW **Main Conference Topic:** Industrial Engineering, Artificial Intelligence Technologies

Introduction

Inventory classification is significant function for organizations to be able to manage inventories. Inventory management requires constant and careful evaluation, depending upon the dynamic structure of inventories. While in some cases the inventory may be very high in volumes, in some other cases inventory may be very high in value but in small quantities. It is important to balance inventory all the time to avoid excess inventory or lower inventory, which can prevent the continuity of work. Therefore, inventory classification can help an organization to maintain optimum inventory levels and determine the suitable ordering policies to be able to meet its requirements.

Conventional ABC analysis is widely employed technique for inventory classification in organizations. This technique is based on Pareto principal that divides the inventory items into the three classes. Class A inventories account for about 80 percent of the dollar usage and 20 percent of the items in the warehouse. Class B inventories account for about 15 percent of the dollar usage and 30 percent of the items. Class C inventories account for about 5 percent of the dollar usage and 50 percent of the items. It is seen that ABC analysis takes in consideration only one criterion of annual dollar usage. Since B and C items aren't as valuable as A items depending on a single criterion, it is seen to pay too little attention to its inventory of them. This causes to be large amounts of stocks which are mostly unmonitored and uncounted items and slackness in record control. In addition, the analysis based on only one criterion which is monetary value of the items ignores the other important factors. For these reasons, ABC analysis is not sufficient for inventory classification. The respective literature survey indicating the multiple criteria inventory classification is summarized here.

Partovi and Burton (1993) applied the analytic hierarchy process (AHP) to inventory classification in order to include both quantitative and qualitative evaluation criteria. Partovi and Anandarajan (2002) proposed an artificial neural network (ANN) approach for inventory classification with regard to four criteria; unit price, ordering cost, demand range and lead time.



Ramanathan (2006) proposed a weighted linear optimization model for multiple criteria, where performance score of each item obtained using a data envelopment analysis (DEA)-like model. Later, scores of the items were classified into class A, B, or C. Hadi-Vencheh and Mohamadghasemi (2011) proposed an integrated fuzzy analytic hierarchy process-data envelopment analysis (FAHP-DEA) for multiple criteria ABC inventory classification. The proposed methodology used the FAHP to determine the weights of criteria and used the DEA method to determine the values of the linguistic terms. Similarly, Torabi, Hatefi, & Saleck Pay (2012) presented a modified model originated from some existing DEAlike models incorporating quantitative and qualitative criteria. The modified model is a linear programming model with improved discriminating power by applying a common weight approach.

Cakir and Canbolat (2008) proposed an inventory classification system based on the fuzzy analytic hierarchy process. They conducted their study in a small electrical appliances company. Kabir and Hasin (2011) presented a comparative analysis of AHP and FAHP for multi-criteria inventory classification model. To accredit the proposed models, those were implemented for the raw materials of switch gear section of a large power engineering company. Kiris (2013) proposed a fuzzy analytic network process approach to determine the weights of the criteria and then determined the scores of the inventory items with simple additive weighting. The application area of the problem is the management of the engineering vehicles' items in a construction firm.

Ketkar and Vaidya (2014) suggested an approach for inventory control by classifying the input materials (raw, packing materials and components) based on the various inventory schemes using simple additive weighting (SAW) method. These schemes are assigned proper weights, considering the organizational vision and mission. Similarly, Iqbal and Malzahn (2017), through the inventory classification schemes, evaluated single-criteria and multicriteria models in terms of their feasibility in classifying inventory items for a given dataset. Their results showed that using criteria in descending order reduces the classification infeasibility. The relationship that they observed between the probability of infeasibility and number of identical scoring items also provides a good insight for a decision maker while selecting a model for a given dataset.

The literature survey on the inventory classification as some examples is given above clearly. This study is different from the others in terms of the application area that is applied to the municipality of a big city for obtaining an ABC classification system. In the next section, the proposed approach is defined and then in Section 3, an application with a real-life problem is given. Then, the proposed approach and traditional ABC analysis results are compared.

The Proposed Approach

This study integrates fuzzy AHP and SAW methodologies. Determining the importance of weights by decision makers, it is utilized fuzzy AHP which is an extension of classical AHP (Saaty, 1980) method. For a decision maker it is extremely difficult to provide exact pairwise comparison judgments, a decision maker may avoid giving sharp answers includes in crisp values. Therefore, fuzzy AHP is more suitable and can give more sensitive results, since it overcomes the fuzziness of the decision makers to handle uncertainty. In the next stage of this study, it is used the SAW method to aggregate item scores under different criteria into an overall score for each item.

Fuzzy AHP Methodology

Chang's (1996) extent analysis method was employed in the study. The extent analysis values for each object can be obtained such as $M_{g1}^1, \ldots, M_{gi}^m$, $i=1, \ldots, n$ where all the M_{gi}^j ($j = 1, \ldots, m$) are triangular fuzzy numbers (TFNs). The extent analysis method steps are presented below:

Step 1: The value of fuzzy synthetic extent with respect to the *i*th object is defined as $S_i = \sum_{j=1}^m M_{g_i}^j \otimes \left[\sum_{i=1}^n \sum_{j=1}^m M_{g_i}^j\right]^{-1}$. To obtain $\sum_{j=1}^m M_{g_i}^j$, the fuzzy addition operation of m extent analysis values for a particular matrix is performed such as $\sum_{j=1}^m M_{g_i}^j = \left(\sum_{j=1}^m l_j, \sum_{j=1}^m m_j, \sum_{j=1}^m u_j\right)$

and to obtain $\left[\sum_{i=1}^{n} \sum_{j=1}^{m} M_{g_i}^{j}\right]^{-1}$, the fuzzy addition operation of

 $M_{g_i}^j$ (j = 1,2, ..., m) values is performed such as

 $\sum_{i=1}^{n} \sum_{j=1}^{m} M_{g_i}^j = (\sum_{i=1}^{n} l_j, \sum_{i=1}^{n} m_j, \sum_{i=1}^{n} u_j)$ and then compute the inverse of the vector in the following such that

 $\begin{bmatrix} \sum_{i=1}^{n} \sum_{j=1}^{m} M_{g_i}^{j} \end{bmatrix}^{-1} = \left(\frac{1}{\sum_{i=1}^{n} u_j}, \frac{1}{\sum_{i=1}^{n} m_j}, \frac{1}{\sum_{i=1}^{n} l_j} \right)$

Step 2: The degree of possibility of $M_2 = (l_2, m_2, u_2) \ge M_1 = (l_1, m_1, u_1)$ is defined as $V(M_2 \ge M_1) = sup_{y\ge x} [\min(\mu_{M_1}(x), \mu_{M_2}(y))]$

and can be equivalently expressed as $V(M_2 \ge M_1) = hgt(M_1 \cap M_2) = {}^{\mu_{M_2}}(d) = (1, \text{ if } m_2 \ge m_1)$

$$\begin{pmatrix} 1, & n & n_2 \leq n_1 \\ 0, & \text{if } l_1 \geq u_2 \\ \frac{l_1 - u_2}{(m_2 - u_2) - (m_1 - l_1)} & \text{, otherwise} \end{cases}$$

where d is the ordinate of the highest intersection point d between μ_{M_1} and μ_{M_2} . Both values of V(M₁≥M₂) and V(M₂≥M₁) are required in order to compare M₁ and M₂.

Step 3: The degree possibility for a convex fuzzy number to be greater than k convex fuzzy numbers, can be M_i (i=1, 2,..., k) defined by

 $V(M \ge M_1, M_2, ..., M_k) = V[(M \ge M_1) \text{ ve } (M \ge M_2) \text{ ve } ... \text{ ve } (M \ge M_k)]$

 $= \min V(M \ge M_i)$ i = 1, ..., k Assume that $d'(A_i) = \min V(S_i \ge S_k)$ for k = 1, 2, ..., n $(k \ne i)$ Then, the weight vector is given by $W = (d'(A_1), d'(A_2), ..., d'(A_n))^T$ where A_i (i = 1, 2, ..., n), are *n* elements.

Step 4: Via normalization, the normalized weight vectors are $W = (d(A_1), ..., d(A_n))^T$ where W is a non-fuzzy number.

SAW Methodology

The simple additive weighting (SAW) is widely used method for multiple attribute decision making because of its simplicity (Hwang, & Yoon, 1981). It is run to find a weighted sum of rating the performance of each alternative on all attributes in the following.

 $S_i = \sum_{c=1}^n w_c v_{ic}$ i=1, 2, ..., m, c=1, 2, ..., n.

Each alternative is evaluated according to each criterion. S_i is the score of the inventory item based on the criteria, w_c is the weight of the *c*th criterion and v_{ic} is the value of *i*th items according to *c*th criteria. The scores of the inventory items for each criterion are also determined by a way of using linguistic terms proposed by Cheng, Yang, & Hwang (1999) in the study as given in Table 1.



Linguistic values for benefit	Linguistic values for cost	The mean of fuzzy
sub-criteria	sub-criteria	numbers
Very High (VH)	Very Low (VL)	1
High (H)	Low (L)	0,75
Medium (M)	Medium (M)	0,5
Low (L)	High (H)	0,25
Very Low (VL)	Very High (VH)	0

Table 1: Linguistic values and mean of fuzzy numbers

An Application of the Proposed Approach

The proposed approach is carried out to the traffic workshop of municipality of a big city. Material procurement to this workshop is done once a year with tender. The amount of materials to be taken in the tenders is determined by the amount of usage in past years and the experience of the decision makers. It is difficult to classify inventories because of the diversity of material items and the factors that affect the criticality of materials. When the traditional ABC analysis of the workshop was examined, it is seen that some problems were observed. For example, in the ABC analysis, although the solar-powered signaling lamps in group C are important for operation, it was seen that the stock controls were made irregular due to its inventory classroom and were depleted when they needed to be used. For these reasons, by deciding that the conventional ABC analysis was not enough to classify stocks in the workshop, it is proposed the fuzzy AHP approach for solving the problem in this study.

Firstly, it is defined main and related sub criteria as seen Table 2 by making discussions with experts on what is important about stock. Then, it is collected data from experts to pairwise comparison of the criterion with linguistic variables as seen Table 3.

Main Criteria	Sub-criteria
	Level of significance (C11)
Necessity (C1)	Substitutability (C12)
	Availability (C13)
	Stock-out cost (C21)
Cost (C2)	Unit cost (C22)
	Carrying cost (C23)
	Lead time (C31)
Purchasing (C3)	Annual demand (C32)
	Demand range (C33)
	Durability (C41)
Storage (C4)	Storage space (C42)
	Date of expiry(C43)

Table 2: Main and sub criteria for multi-criteria inventory classification

Table 3: L	Definition (and meml	bership f	function	of fuzzy	scale
1000000	gunnen	cirici nitenite	jei snip j	menen	orially	Jeare

Linguistic variables	Fuzzy number	Membership function
Equally important	1	(1, 1, 3)
Moderately important	3	(1, 3, 5)
Strongly important	5	(3, 5, 7)
Very strongly important	7	(5, 7, 9)
Extremely important	9	(7, 9, 9)



In this study, evaluations were made by taking the opinions of three experts. Experts are qualified staff working in the traffic workshop and procurement department. The linguistic evaluations taken from of the experts are converted into triangular fuzzy numbers using the scale given in Table 3. Then, it is aggregated the views of the three experts by using with the geometric mean and the Table 4 shows this values. More, the weight calculation is made according to the Chang's (1996) extent analysis method explained section 2.1 and the values of weights are demonstrated in Table 4.

Main		C1			C2			C3			C4		W
criteria	(L)	(M)	(U)	(L)	(M)	(U)	(L)	(M)	(U)	(L)	(M)	(U)	eights
C1	1,00	1,00	1,00	1,00	3,00	5,00	1,44	3,56	5,59	3,56	5,59	7,61	0,49
C2	0,20	0,33	1,00	1,00	1,00	1,00	1,00	2,08	4,22	1,44	2,47	4,72	0,32
C3	0,18	0,28	0,69	0,24	0,48	1,00	1,00	1,00	1,00	1,00	1,00	3,00	0,16
C4	0,13	0,18	0,28	0,21	0,41	0,69	0,33	1,00	1,00	1,00	1,00	1,00	0,02

Table A. The	a concorte d		aniniana	for		anitania
Table 4: The	aggregaiea	experi	opinions	jor	main	criieria

Similarly, pairwise comparison matrixes of sub criteria are constructed and calculated local weights. Then, the global weights are found multiplying the main criteria weights by the sub criteria weights as seen in Table 5. More, in this table, as an example, white colored road line paint with 001 stock code is evaluated using SAW method explained section 2.2. The linguistic evaluation of the item according to each criterion is converted into a scale value. Following that, it is obtained 0.56 score as value of inventory by summing the product of the scale values and the global weights

((0,351*0,75)+(0,107*0,50)+0,035*0+0,216*0,5)+(0,08*0,25)+(0,026*0,25)+(0,114*0,5)+(0,03*1)+(0,013*1)+(0,017*0,25)+(0,004*0,5)+(0,002*0,75) = 0,56)). Then, these inventory values are sorted in descending order and classified to the groups A, B, C. The number of the items in the groups is determined according to the same number of the groups in conventional ABC analysis.

In this study, the 40 pieces in the traffic workshop of municipality of big city were evaluated. Compared with the conventional ABC analysis, 24 items in the fuzzy AHP method were included in the same group, while the group in which the 16 items were found changed. 1 item in group B and 3 items in group C according to the ABC analysis came to group A by the fuzzy AHP method. This is because in the conventional ABC analysis the only criterion taken into account is the annual dollar usage. Table 5 demonstrates global weights and inventory evaluation for an item as a sample.

Main	Main	Sub-	Sub-	Global	An example evalution inventory of 001	uation of the stock code
Criteria	Weights	Criteria	Weights	Weights	Linguistic variable	Scale Value
		C11	0,71	0,351	Н	0,75
C1	0,49	C12	0,22	0,107	М	0,50
		C13	0,07	0,035	VL	0,00
		C21	0,67	0,216	М	0,50
C2	0,32	C22	0,25	0,080	Н	0,25
		C23	0,08	0,026	Н	0,25
		C31	0,71	0,114	М	0,50
C3	0,16	C32	0,21	0,033	VH	1,00
		C33	0,08	0,013	VH	1,00
		C41	0,73	0,017	L	0,25
C4	0,02	C42	0,17	0,004	М	0,50
		C43	0,09	0,002	Н	0,75

Table 5: The global weights of the criteria and example of evaluat	ng an inventory
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Conclusion

Inventory management requires determining the optimal levels of inventory, deciding when and how much they need to be reorder for organizations. Accordingly, classifying the inventory is important to draw managers' attention on the pieces that require tight inventory control or pieces that low demand and higher risk of excessive inventory. In this study, the fuzzy AHP is used to determine the criteria weights. This approach supports to provide sensible evaluations by overcoming the fuzziness of the decision makers in uncertainty environments. In addition, a real case was investigated in a big city municipality taking into account the multi criteria includes necessity, cost, purchasing and storage with their subcriteria



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The Performance of Markovian Approach on Solar Radiation Data Generation

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Abstract

Solar radiation data is the most important parameter to evaluate the performance of photovoltaic modules by calculating the output power of module using the module parameters beside the radiations. However sometimes it is difficult to obtain measured solar radiation data in any region in long term. For such cases synthetic solar radiation data is needed that carry the featured of measured radiation data. Among others in this paper it is stated that it is possible to use a first order Markovian approach to generate synthetic data. To claim the effectiveness of the suggested approach the generated solar radiation data is compared with measured data. Finally the simulation results are illustrated and discussed.

Keywords: Solar Radiation, Synthetic Data Generation, Forecasting **Main Conference Topic:** Engineering

Introduction

Studies on solar radiation have critical importance since the radiation is the main parameter that effects the solar module generation. However accurate measurement of solar radiation requires a sensitive pyranometer and the pyranometer must be calibrated in a period of time. Moreover sometimes it is difficult to measure solar radiation in a long period of time. Therefore a different approach is needed to generate synthetic solar radiation data. Duplication of yearly data can be considered as an approach. However stochastic approaches that carry information about the main features of solar radiation data will give better results in generation.

Probabilistic process shows high accurate solutions in the forecasting. Hocaoglu and Serttas (2017) present a novel Mycielski - Markov model for short term solar radiation forecasting [2]. Their model considers the recorded hourly solar radiation data as an array and starting from the last record value, it tries to find most similar sub-array pattern in the history. In order to model the probabilistic relations of the data, a first order Markov chain model is adopted. Successful results are shown by comparing other literature studies. Ngoko et al. (2014) present another model for the synthetic generation of minutely solar radiation data used the daily clearness index [3]. This model is formed by treating the process producing a normalized form of the minutely clearness index vector as a Markovian process. Bhardwaj et al. (2013) used Hidden Markov Model (HMM) combined with the Pearson R model for the



determination of groups from the meteorological parameters and it is then processed by the Generalized Fuzzy Model (GFM) to forecast solar radiation [4]. The compared Root Mean Square Error (RMSE) values show accurate results. Vindel and Polo (2014), has shown that a Markov process can represent properly sequences of two consecutive daily irradiation values, for both global horizontal and direct normal components [5]. Teke et al. (2015) overview the recent solar radiation modeling techniques to identify optimum models and show Hidden Markov Models have accurate forecasting results [6]. Mellit et al. (2005) propose a combined model can be used to forecast daily solar radiation data by combining an artificial neural network (ANN) and a library of Markov transition matrices (MTM) approach [7]. Kakimoto et al. (2014) proposes a two-state Markov model to determine the storage size of a photovoltaic system. Markov models show reliable performance also in this research [8]. Markov chains has been used in solar radiation forecasting recently [1]. In that study a Markov based stochastic approach has been proposed for one year synthetic solar radiation data generation. Apart from other studies, in this study the performance of long term solar radiation data generation is explored. To explore the performance of long term data generation via Markov chain a first order Markov approach. The arrangement of the paper is as follows:

The theory of the Markov chain is presented in Section 2. The model and the data used is mentioned briefly in Section 3. The performance of the solar radiation generation is tested in Section 4. Finally the results are discussed in Section 5.

Markov Chains

Mathematical Markov (or Markovian) chain is a causeless process that has the Markovian characteristic. Markovian characteristic is a random process, often described as memory-free. In the other words, the following state will depend not only on the past but on the actual situation. Markov chains can have many applications as a statistical model.

The Markov chain indicates the order of the arbitrary random variables (eg, a "chain") that progresses through a process that only identifies the serial dependency between adjoining Markov properties. This can be used to describe systems that follow chain of related events; events only depend on the current state of the system. The Markov chain equation is shown in Equation 1.

$$P(X_{n+1})=j | X_0=i_0,...,X_{n-1}=i_{n-1},X_n=i)$$

$$P(X_{n+1})=j | X_n=i)=p_ij (n)$$
(1)

In these formulations, i, $j \in S$ and $n \ge 0$, p if (n) is the probability of transition at the n step. The probability of transition p_{ii} is the probability of transition to state j from state i to the state of the following trial j (current state). The Markov chain is nearly memory-free. The transition probabilities p_ij (n) in step n are placed in a matrix according to Eq. 2 as the columns in the present case and the cases in the future are the columns. Equation 3 also refers to the sum of elements in a row. All possibilities have to have a sum of 1.



 $p(n) = \left[p_{ij}(n)\right]_{i,j \in S}$

 $\sum_{j \in S} p_{ij}(n) = 1$

(3)

Synthetic Global Solar Radiation Generation

Global solar radiation data of Afyonkarahisar is measured by a pyranometer in Afyon Kocatepe University Solar and Wind Energy Research & Application Center. This measured data is logged by a data-logger in every ten minutes for three years. After logging process, ten minutes data are converted into one-hour ahead data. Hourly solar radiation data is used to estimate in the solar radiation forecasting with the novel Markov based model presented in this study.

There are many different values in the solar radiation data. Therefore, solar radiation data is converted into states firstly. In this study, 15 states are formed and tested. In the Markovian process, a state transition probability matrix and its cumulative matrix are formed according to these states. Initial state value is taken as start. Then this value is determined as the row number of the cumulative matrix. In this step, a random number is generated between 0 and 1. The value corresponds to the biggest of the number worth is taken as the prediction value. Finally assign the last finding value as a new vector and loop this algorithm until the determined number.

The Performance of Generator

To test the performance of the proposed generator, 2 years hourly solar radiation data are generated from the hourly global solar radiation data of Afyonkarahisar. The year of 2011 radiation data is used to model and by using this model, 2012 and 2013 years are generated (predicted). The measured global solar irradiance data at Afyonkarahisar city is provided in Fig. 1 whereas the model generated data is provided in Fig. 2.





Figure 1. Two years measured global solar radiation data



Figure 2. Two years generated global solar radiation data by Markov model

To compare the results the data are plotted in the same graph at Fig. 3.





Figure 3. Comparison of the Measured and Generated Two Years Solar Radiation Data

As seen from the Fig. 3 the model gives reasonable prediction results. However it is also important to compare the basic statistics given and the root mean square error between the measured and predicted data. Therefore in Table 1, the basic statistics of measured and predicted (model generated) data are compared. Furthermore in Table 2 the RMSE value between the predicted and measured data are provided.

	Measured	Predicted
Average Value	191.379 W/m²	196,203 W/m²
Standard Deviation	281.406 W/m ²	274.483 W/m ²
Variance	$79190 (W/m^2)^2$	$75341 (W/m^2)^2$
Max. Value	1040 W/m²	975 W/m²

	RMS Error	RMS Energy	%RMSE
First Year	147,13 W/m ²	339,49 W/m²	%43,3
Second Year	147,69 W/m²	341,17 W/m ²	%43,28

Table 2. RMSE Values Between Measured And Predicted



It is obvious from the results that proposed approach can be adopted and used for long term solar radiation data generation and this generated data can be considered as predicted data.

Discussion of the results

In previous section the performance of proposed method is provided the results indicate reasonable prediction results. In this section on the other hand a further analysis is performed. Yearly measured data is accepted as the prediction of next year. The RMSE value shown in Table 2 between the measured and predicted values are calculated. The measured and predicted values are provided in the same graph in Fig. 4.



Figure 4. Comparison of Two Years Global Solar Radiation Data (2012-2013)

Table 2.	RMSE	values	between	years	directly
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RMSE (First Year)	149,54 W/m²
RMSE (Second Year)	150,32 W/m ²

Finally it is obtained that proposed generation outperforms the usage of previous years data as prediction.

Conclusion

In this paper the performance of first order Markovian approach in solar radiation prediction is tested on hourly measured solar radiation data. For this aim, hourly solar radiation data



measured at Afyonkarahisar region is employed. Using one year data and proposed approach hourly data are generated for two years. Producing of solar radiation data for many years for the region is possible using the proposed method. Measured data and predicted data are compared in the sense of RMSE and <u>comparison of basic statistics</u>. Finally it is concluded that proposed synthetic solar radiation approach can be used for forecasting. The impact of the number of the states in the accuracy of solar radiation data generation can be regarded as future work.

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An Experimental Setup Design for Power Electronics Experiments

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Abstract

Power electronic experiments need much more attention and caution because of controlling the electrical energy. Any mistake (such as short circuit or misconnection) may result in a failure or destruction on setup. In order to prevent malfunctions and protect students and researchers, an experimental setup is designed and manufactured for power electronics laboratory education. The setup consists of followings; diode module, thyristor-triac module, resistor-capacitor bank, MosFET-IGBT module, variable resistor-load module, duty cycle control module, and SCR trigger angle control module. The experimental setup is able to reduce the entry voltage from 380 V to 50V with a three phase 380V-50V transformer for security reasons. Also, it includes AC and DC ammeters and voltmeters for corresponding measurements. To control and validate the experimental setup, the effect of the capacitor, which is located on the output of a full-bridge rectifier, to input and output signals is investigated and the results are presented.

Keywords: Power electronics, Experimental setup, Rectifier. **Main Conference Topic:** Engineering

Introduction

Around 40 percent of the world's power needs are currently met by electrical energy and that proportion is expected to rise as countries cut carbon emissions and shift to renewable energy sources. As the trend towards electrification and renewable energies increases, enabling technologies such as power electronics are becoming ever more important [1]. There are a lot of studies on power electronics in the literature. The experimental setups are very important due to both validate the theoretical analysis and improve the quality of education for students. Some of the studies made in this direction are presented below.

Shen and Lehn present a new approach for the dynamic control of a current source inverter (CSI)-based STATic synchronous COMpensator (STATCOM). The new approach includes a fast ac current control inner loop and a slower dc current control outer loop. They test the approach on a 5 kVA laboratory CSI STATCOM setup and show that the tests validate the proposed control design as well as the simulation results [2]. Rubaai et al. develop a novel control topology of adaptive network-based fuzzy inference system (ANFIS) for control of the dc–dc converter. They design and built an experimental test bed to test the developed topology. The experimental setup consists of a 14-bit PCI data acquisition processor, a termination board, Pentium III 550-MHz personal computer and a micro-

controller. Experimental setup provides them the opportunity to show the success of the topology they proposed [3].

Sadigh et al. presents a new configuration of flying capacitor multi-cell (FCM) The circuit simulated using power systems converter. is computer aided design/electromagnetic transients in DC systems (EMTDC) software. To validate the effectiveness and advantages of the proposed configuration, they built an experimental setup. The four-cell-nine-level proposed DFCM converter was built with ten IRFP460 500V 20A MOSFETs, 1 mF flying capacitors, 75Ω -90mH resistive-inductive loads and DC voltage level, switching frequency and modulation index values were 100 V, 2.1 kHz and 0.8, respectively [4]. Eni et al. studied on the design of a setup for short-circuit (SC) testing of 10 kV 10A 4H-SiC MOSFETs. The setup can achieve voltages up to 10 kV and currents in excess of 100A. The aim of the study is to obtain low parasitic inductance throughout the setup, while at the same time, reduce the complexity and size of the setup by avoiding series connection of DC-link capacitor [5].

Han et al. propose a novel nonlinear droop-free distributed controller. They built an experimental setup to validate the effectiveness of the proposed controller by comparing with different controllers and communication strategies. The setup consists of four parallelconnected dc-dc buck converters, dSPACE controller and monitoring platform, LC filters, line impedances and resistive loads. The experimental setup is a proper platform for testing the proposed controller [6]. Cheng et al. demonstrate how a power electronics experiment is programmed in a remotely controlled laboratory setup. In this setup, students can conduct the experiment without any limitation of time and space. They express that the feedback from the students is very positive and it can also give an alternative solution for conducting hardware laboratory when distance learning is used [7]. Akarslan et al. propose an experimental setup design to evaluate power generation performances of TECs under different temperatures. The setup includes two water tanks, loads, TEC modules, computer interface and a data acquisition system [8]. In this study an experimental setup for power electronics experiments is manufactured. The setup consists of followings; diode module, thyristor-triac module, resistor-capacitor bank, MosFET-IGBT module, variable resistor-load module, duty cycle control module, and SCR trigger angle control module. It also includes measurement equipment such as voltmeter and ammeter. The aim of the study is to design a practical and safer experimental setup for students and researchers. A sample experiment is performed on the setup due to validate the effectiveness of it. The details of the experimental setup and results are given in the paper.

Experimental Setup Design Details

The setup provides an opportunity to perform fundamental power electronics experiments such as determining I-V characteristics of different semiconductors, automatic controlled triac experiment, DC-DC convertor and regulator experiment, control circuit with SCR experiment etc. in an easy and safety way. Furthermore, such experimental setups are important equipment in teaching.

The designed experimental set consists of a sheet metal body and suitable for on-table or on-wall operations. The overall view of the setup is showed in Figure 1. There is a three phase power unit on the set to provide energy it needed.





Figure 1: The general view of the setup

The voltage amplitude is reduced from 380V to 50 V via a 380/50 transformer for security reasons in experiments which will be executed by students. It is also possible to use 380 V phase-to-phase or 220 V phase-to-neural. An emergency stop button is located on an easily accessible location as seen in Fig.1. The experimental setup includes two ammeters (one of them for DC measurements and the other for AC) and two voltmeters (one of them for DC measurements and the other for AC) as seen in Figure 2. For oscilloscope required measurements, a portable oscilloscope can be used (the oscilloscope is not fixed on setup due to easy to use).



Figure 2: The fixed part (entry and measurement) of the setup

The resistor-capacitor module consists of resistors and capacitors in different values. These are determined according to experiments which will be made during the education in an academic year. It is possible to add new resistors and capacitors with a new resistorcapacitor module.

The diode module consists of six independent 6A10 diodes. The variable resistor load module includes a $10k\Omega$ potentiometer, a light dependent resistor (LDR), a positive temperature coefficient (PTC) thermistor, and a negative temperature coefficient (NTC) thermistor. Furthermore, a DC motor and a DC light are used as controllable load in the module. The MosFET-IGBT module includes three IRFP460 MosFET and three STGY40NC60 IGBT as seen in Figure 3. The thyristor-triac module consists of three thyristor and three triac, and it is especially necessary for AC switching applications. TIC106

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and TIC206 are employed as thyristor and triac in this module, respectively. The printed circuit board of the thyristor-triac module is shown in Figure 4.



Figure 3: The MosFET-IGBT module



Figure 4: The printed circuit board of the thyristor-triac module

The duty cycle control module includes a control circuit with NE555. There is $100k\Omega$ potentiometer to adjust the output signal duty cycle. A light and a DC motor are used as load in this module. All connections have already been made except the power and load. Therefore, the user of the module only connects these. Moreover, the module surface has the schematic of the NE555 connections as shown in Figure 5.



Figure 5: The picture of the designed DC Power Control module

Three phase SCR Converter module is designed to perform AC-AC voltage converter. The driver circuit already designed, however the thyristor terminals has not been connected. The user should make the related thyristor connection by own. There is a switch on the

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module to activate the driver. After the activation, the potentiometer can adjust the α trigger angle. Therefore the output will be change. The driver circuit for one phase of the SCR converter module is shown in Figure 6. The module includes three driver circuits shown in Figure 6.



Figure 6: The driver circuit for one phase SCR [9]

A Sample Experiment and Results

To validate the effectiveness of the experimental setup, a sample experiment is performed on the set. The investigation of the effects of the capacitor, connected to output of the full bridge rectifier, on input and output signals is selected as a sample experiment. The rectifiers are one of the most basic applications in the field of power electronics. Therefore, it is selected as sample experiment. In the first part of the experiment a full bridge rectifier circuit is built with a resistor at the output as seen in Figure 7.



Figure 7: The connection schema on experimental setup (first part)

In Figure 7, the green lines represent the cable connections. The input and output signals are observed via an oscilloscope. The input and output signals are shown in Figure 8.



The yellow lines represent the current waveforms and the purple lines represent the voltage waveforms.



Figure 8: The input (left) and output (right) signals in the absence of capacitor

In the second part of the experiment, a 1 μ F capacitor connected to resistor in parallel to investigate the effects of it to the input and output signals. The principle connection schema of the second part is shown in Figure 9. As seen in the figure, two more connections are made to activate the capacitor.

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Figure 9: The connection schema on experimental setup (second part)

The input and output signals of the second schema is shown in Figure 10. As seen in the figure, the output signal gets better (almost DC). However, the input current signal gets worse (not AC anymore). Thus, it can be concluded that the capacitor changes the input current waveform and causes harmonics.



Figure 10: The input (left) and output (right) signals

The experiment on the experimental setup shows that such a set provides an easy to use implementations and saving time. Students are able to understand both electrical connections and fundamentals of experiments on such sets due to visuality. Also, it provides security against to electric shocks due to ensure an isolated environment in student experiments. As indicated earlier, the setup consists of modules and none of the modules have an electrical connection to the main body. Therefore, they can be easily detached and plugged.



Conclusion

This study focuses on to design an experimental setup which gives opportunity to perform power electronics experiments. The setup consists of several parts such as diode module, thyristor-triac module, resistor-capacitor bank, MosFET-IGBT module, variable resistor-load module, duty cycle control module and SCR trigger angle control module. One of the most important advantages of the set is to design and add new modules according to needs. In comparison with breadboard experiments, the setup is more reliable, secure, faster, and easy to use. A sample experiment (full bridge rectifier) performed on experimental setup in order to demonstrate how the setup will be used in future.

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A Fuzzy Decision Making Approach on Selecting Subcontractors and Determining Order Quantities

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Abstract

This paper aims to present an approach to find most suitable subcontractors and determine near-optimal order quantities based on fuzzy methods. Problem complexity and uncertainty that lies in nature of these strategic decisions stimulates researches to find more appropriate solutions. There are a number of criteria that can be used to assess subcontractors. In this study cost, quality, and timeliness are considered for determining subcontractors. On the other hand fluctuation of demand and prices makes it harder to determine order quantities. Fuzzy TOPSIS method used to find ranking of all subcontractors as closeness coefficients based on their performance in these criteria. These coefficients are used in fuzzy linear programming as an input to objective function. In this approach both quantitative and qualitative factors are considered. It has been shown that more realistic and accurate solutions can be obtained for subcontractor selection and order quantity determination using these methods.

Keywords: Fuzzy Linear Programming, Fuzzy TOPSIS, Subcontractor Selection **Main Conference Topic:** Engineering, Artificial Intelligence

Introduction

TOPSIS is developed by Hwang and Yoon and it is widely used for multi-criteria decision making problems (Chen, 2000). This method is based on distances of alternatives from negative and positive ideal solutions. It is intended to make a decision that is closest to positive ideal solution and farthest from negative ideal solution. Thus negative ideal solutions are also considered (Wang, Cheng & Huang, 2009). TOPSIS requires relative priorities and scorings of experts' about a topic. Due to ambiguous nature of human decision making, it is compatible with fuzzy logic. The objective is to find nearest optimum solution. Fuzzy TOPSIS (FTOPSIS) can be used to make decisions in uncertain and continuously changing market conditions.

Linear Programming (LP) is used to find optimum solutions for linear problems with constraints. Depending on the problem structure, minimum or maximum value for the objective function is searched (Demiral, 2013). On the other hand Fuzzy Linear Programming (FLP) can be used with fuzzified objective function and constraints. There are several approaches to solve FLP problems such as Zimmermann, Chanas, Werners, and Verdegay.



Application

Product X will be produced in a company. There are some constraints that should be met in order to produce this product. Three different subcontractor is available with the machine capacities shown in Table 1. The problem is solved in two stages. FTOPSIS method is used to decide subcontractor selection in the first stage. Then, FLP method is used to determine product quantities in the second stage.

Subcontractor	Machine capacity
А	3000
В	5000
С	4000

Table 1: Subcontractors and Their Production Capacities

Demand for product X is changed between 5000-12000 units monthly. The company supplies paint powder that is used in production of X. A, B, and C subcontractors demands different amount of paint powder as 3 kg, 4 kg, and 6 kg, respectively. The company can monthly provide 20000 kg or 30000 kg paint powder to subcontractors. Minimum amount of order quantity is 500 units due to transportation, packaging, etc. costs. Considering all this constraints, the company needs to determine how many units of product X should be ordered from which subcontractor.

A, B, and C subcontractors are qualified companies which have required specifications for the production of X. They are also convenient to be easily reached as their location is near to the company. Three criteria have been determined to choose among this subcontractors namely, cost, quality, and time.

Subcontractors are used in several occasions such as when the company cannot produce the ordered products in its due date or it costs more if it is produced within the company compared to cost of subcontractor. The most important point is the timeliness of a subcontractor. As it can cause tardiness in the order, which can cause company to make discount as a punishment or worse lose its customers and tarnish its image in the sector. Thus decision on a subcontractor selection has a vital importance for the company. For this reason criteria for selecting subcontractor should be considered studiously.

First Stage: FTOPSIS

In step 1 weights of criteria and alternatives are determined. Experts' opinions about these criteria and alternatives are collected. Expert opinions are used to evaluate criteria and alternatives using linguistic expressions such as "Good", "Mediocre", and "Bad". These expressions are converted to fuzzy numbers. Linguistic variables and related fuzzy numbers which are used to evaluate alternatives are given in Figure 1. According to Figure 1 linguistic expressions are converted to fuzzy numbers as given in Table 2.

All gathered linguistic expressions from experts are used to calculate decision matrix. Opinions of three expert from the company have been obtained for determined criteria as given in Table 3.



Figure 1: Fuzzy numbers used to evaluate alternatives Table 2: Fuzzy Numbers Corresponding to Linguistic Expressions

Linguistic Expression	Fuzzy Number
Very Good	891010
Good	7889
Mediocre Good	6778
Mediocre	4567
Mediocre Bad	3445
Bad	1234
Very Bad	0012

Table 3:	Expert (Opinions	on Three	Criteria

Criterion	Expert 1	Expert 2	Expert 3
Cost	Very High	High	Very High
Quality	High	High	Very High
Time	Very High	Very High	High

Similarly, opinions of three expert for alternative subcontractors in terms of criteria are given in Table 4. These linguistic expert opinions are converted to fuzzy numbers using equations (1), (2), (3), (4), and (5).

Criterion	Subcontractor	Expert 1	Expert 2	Expert 3
	A	Good	Fair	Good
Cost	В	Very Good	Good	Fair
	С	Fair	Very Good	Fair
	A	Good	Fair	Fair
Quality	В	Fair	Good	Good
	С	Very Good	Very Good	Fair
	A	Good	Fair	Fair
Time	В	Fair	Fair	Good
	С	Very Good	Good	Fair

Table 4: Expert Opinions on Alternative Subcontractors Based on Three Criteria

$R^* = \left(a_{ij}^*, b_{ij}^*, c_{ij}^*, d_{ij}^*\right)$	(1)
$a_{ij}^*=min_k\{a_{ij}^*\}$	(2)
$b_{ij}^* = rac{1}{k} \sum_{k=1}^K b_{ij}^k$	(3)
$c_{ij}^* = rac{1}{k} \sum_{k=1}^K c_{ij}^k$	(4)
$d_{ij}^* = max_k \{d_{ij}^k\}$	(5)

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After using these equations evaluation of each subcontractor matrix is obtained which is given in Table 5. In step 2 importance of criteria converted from lingual expressions to fuzzy values as in shown in Table 6. Then in step 3, using the decision matrix obtained in step 1 each element in a row is divided by maximum value in that row to normalize its values as Equation (6). Resulting normalized decision matrix is given in Table 7.

$$v_{ij} = \frac{x_{ij}}{x_{j^*}} \quad \text{where} \quad x_{j^*} = max_i(x_{ij}) \tag{6}$$

Table 5: Evaluation of Each Subcontractor Based on Three Criterion

Subcontractor	Cost	Quality	Time
А	4.00, 7.00, 7.33, 9.00	4.00, 6.00, 6.77, 9.00	4.00, 6.00, 6.77, 9.00
В	4.00, 7.33, 8.00, 10.0	4.00, 7.00, 7.33, 9.00	4.00, 6.00, 6.77, 9.00
С	4.00, 6.33, 7.33, 10.0	4.00, 7.67, 8.67, 10.0	4.00, 7.33, 8.00, 10.0

Cost	0.700	0.867	0.933	1.000
Quality	0.700	0.833	0.867	1.000
Time	0.700	0.867	0.933	1.000

Table 6: Fuzzy Values of Criteria Importance

Subcontractor	Cost	Quality	Time
А	0.44, 0.78, 0.81, 1.00	0.44, 0.67, 0.75, 1.00	0.44, 0.67, 0.75, 1.00
В	0.40, 0.73, 0.80, 1.00	0.40, 0.70, 0.73, 0.90	0.40, 0.60, 0.67, 0.90
С	0.40, 0.63, 0.73, 1.00	0.40, 0.77, 0.87, 1.00	0.40, 0.73, 0.80, 1.00

In step 4 weighted normalized decision matrix is obtained by multiplying normalized decision matrix with criteria weights, which is given in Table 8.

Subcontractor	Cost	Quality	Time
А	0.31, 0.67, 0.76, 1.00	0.31, 0.56, 0.65, 1.00	0.31, 0.58, 0.70, 1.00
В	0.28, 0.64, 0.75, 1.00	0.28, 0.58, 0.64, 0.90	0.28, 0.52, 0.63, 0.90
С	0.28, 0.55, 0.68, 1.00	0.28, 0.64, 0.75, 1.00	0.28, 0.64, 0.75, 1.00

Table 8: Weighted Normalized Decision Matrix

In step 5 positive and negative ideal solutions, which are given below are determined using Equations (7) and (8), respectively.

$$A^* = (v_1^*, v_2^*, \dots, v_n^*) \quad \text{where} \quad v_j^* = max\{v_{ij4}\}$$
(7)

$$A^{-} = (v_{1}^{-}, v_{2}^{-}, \dots, v_{n}^{-}) \text{ where } v_{j}^{-} = min\{v_{ij1}\}$$
(8)

$$A^* = [(1, 1, 1, 1), (1, 1, 1, 1), (1, 1, 1, 1), (1, 1, 1, 1)]$$

 $A^{-} = [(0.28, 0.28, 0.28, 0.28), (0.28, 0.28, 0.28, 0.28), (0.28, 0.28, 0.28, 0.28), (0.28, 0.28, 0.28), (0.28, 0.28, 0.28)]$


After determining positive and negative ideal solutions Chen's (2000) vertex method given in Equation (9) is used to find candidate subcontractors' distance from positive and negative ideal solutions, which is given in Table 9 and Table 10. Total distance is calculated by summing distances from positive and negative ideal solutions as in given in Table XI.

$$d(A,B) = \sqrt{\frac{1}{4}[(m_1 - n_1)^2 + (m_2 - n_2)^2 + (m_3 - n_3)^2 + (m_4 - n_4)^2]}$$
(9)

In Equation (9), m indicates values from weighted normalized decision matrix, n indicates positive or negative ideal solution values. This process is repeated for each alternative and criterion.

Subcontractor	Cost	Quality	Time	Total
d(A, A*)	0.399	0.445	0.431	1.275
d(B, A*)	0.423	0.457	0.443	1.323
d(C, A*)	0.453	0.421	0.423	1.298

Table 9: Candidate Subcontractors' Distance from Positive Ideal Solutions

Table 1	0. Candidat	e Subcontractors	' Distance	from N	legative	Ideal	Solutions
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Subcontractor	Cost	Quality	Time	Total
d(A, <i>A</i> ⁻)	0.476	0.428	0.443	1.347
d(B, <i>A</i> ⁻)	0.464	0.388	0.376	1.229
d(C, <i>A</i> ⁻)	0.434	0.466	0.464	1.365

Table 11: Subcontractors' Total Distance From Positive and Negative Ideal Solutions

Subcontractor	d*	d ⁻	Total
А	1.275	1.347	2.623
В	1.323	1.229	2.551
С	1.298	1.365	2.662

In step 6 closeness coefficients given in Table 12 are calculated using Equation (10).

$$CC_i = \frac{d_i^-}{d_i^* + d_i^-} \tag{10}$$

Table 12: Closeness Coefficients of Candidate Subcontractors

Subcontractor	Value	Rank
А	0.514	1
В	0.482	3
С	0.513	2

Subcontractor A is ranked first with the maximum value. From now on optimum distribution of production quantities will be searched with fuzzy linear programming. These closeness coefficients will be used in objective function of linear programming model.

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Second Stage: FLP

Fluctuation in demand causes uncertainty that makes it harder to solve with classical LP. Fuzzy version of LP method is more appropriate for this problem. LP model can be converted to FLP by fuzzifying objective function and/or some/all of the constraints. General FLP model is given in Figure 2.

> $\max Z = \sum_{i=1}^{n} \tilde{c}_i x_i$ Subject to; $\sum_{i=1}^{n} \tilde{a}_{ii} x_i \leq \tilde{b}_i \quad (i = 1, 2, ..., m)$ x > 0

Figure 2: General FLP model

Zimmerman method is used in this study (Zimmermann, 1991). According to the Zimmerman a tolerance approach can be used in symmetric model of FLP, which make it possible to use in actual problems (Wang, 1997). In this model, simultaneous satisfaction of objective function and constraints are tried to obtain (Kaymak & Costa Sousa, 2001). A new variable λ is defined to find the element of highest level membership degree. After adding this variable the model can be expressed as classical LP which is given in Figure 3 (Zhao, Govind, & Fan, 1992).

Membership functions of fuzzy objective function and constraints can be implemented to FLP model given in Fig. X1 to obtain Zimmermann LP model given in Figure 4. Deterministic constraints are added to model as $(Ex)_i \leq b_i$ (Özkan, 2003). Variables of c, A, b_0, p_0, b_i and p_i are given by decision maker before starting solution.

maxλ	
Subject to;	
$\mu(c^T x) \geq \lambda$	
$\mu(Ax)_i \geq \lambda$	
$\lambda \in [0,1]$	

Figure 3: FLP model expressed as classical LP

 $\max \lambda$ Subject to; $c^T x \ge \mathbf{b}_0 - (1 - \lambda) p_0$ $(Ax)_i \leq \mathbf{b}_i + (1 - \lambda)p_i, \forall i$ $(Ex)_i \leq b_i$ $\lambda \in [0,1]$ $x \ge 0$

Figure 4: LP model of Zimmermann

Fuzzy objective function and fuzzy constraints are calculated as in Equations (11) and (12), respectively (Lai & Hwang, 2012).

$$\mu(c^{T}x) = \begin{cases} 0, & \text{if } c^{T}x < b_{0} - p_{0} \\ 1 - \frac{b_{0} - c^{T}x}{p_{0}}, & \text{if } b_{0} - p_{0} \le c^{T}x \le b_{0} \\ 1, & \text{if } c^{T}x > b_{0} \end{cases}$$
(11)
$$\mu(Ax)_{i} = \begin{cases} 0, & \text{if } (Ax)_{i} > b_{i} + p_{i} \\ 1 - \frac{(Ax)_{i} - b_{i}}{p_{i}}, & \text{if } b_{i} \le (Ax)_{i} \le b_{i} + p_{i} \\ 1, & \text{if } (Ax)_{i} < b_{i} \end{cases}$$
(12)



Closeness coefficients which are obtained by FTOPSIS are utilized in objective function coefficients of fuzzy linear programming. It was given that powder power can be 20000 kg or 30000 kg. Thus problem is solved for these two values to obtain two objective function values.

 x_i indicates amount of powder power that will send to subcontractor i (i=1, 2, 3 which are A, B, and C respectively), which takes integer values. y_i indicates whether or not send to subcontractor i (i=1, 2, 3 which are A, B, and C respectively), which takes binary values of 0 or 1.

The model given in Figure 5 is solved using Lingo software with objective function value of 2861.75 at the values of $x_1=3000$, $x_2=2750$, and $x_3=0$. Paint powder constraint changed to 30000 and re-solved the problem and obtained the results in which objective function value of 3959.50 at the values of x_1 =3000, x_2 =4500, and x_3 =500.

$\max z = 0.513x_1 + 0.481x_2 + 0.512x_3$
Subject to;
$x_1 \leq 3000$
$x_2 \leq 5000$ Capacity constraints
$x_3 \leq 4000$
$x_1 + x_2 + x_3 \ge 5000$ Forecasted demand
$x_1 + x_2 + x_3 \le 12000$
$3x_1 + 4x_2 + 6x_3 \le 20000$ Paint powder constraint
$-x_1 + 3000y_1 \le 2500$
$-x_2 + 5000y_2 \le 4500$
$-x_3 + 3333.33y_3 \le 2833.33$ Quantity
$x_1 - 3000y_1 \le 0$ [constraints
$x_2 - 5000y_2 \le 0$
$x_3 - 3333.33y_3 \le 0$

Figure 5: LP model of the problem

Coefficients of membership function are required to solve problem as fuzzy, which are given in Table 13. FLP model which is given in Figure 6 is solved using Lingo software with membership function value of 0.523 at the values of $x_1=3000$, $x_2=3943$, and $x_3=0$. Thus objective function value is 3435.58.

Table 13: Coefficients of Membership Function

Amount of paint powder	30000-20000 = 10000
Forecasted demand	12000-5000 = 7000
Objective function	3959.50-2861.75 = 1097.75

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```
\begin{array}{l} \max z = t \\ \text{Subject to;} \\ 0.513x_1 + 0.481x_2 + 0.512x_3 - 1097.75t \geq 2861.75 \\ 3x_1 + 4x_2 + 6x_3 + 10000t \leq 30000 \\ x_1 \leq 3000 \\ x_2 \leq 5000 \\ x_3 \leq 4000 \\ x_1 + x_2 + x_3 + 7000t \leq 12000 \\ -x_1 + 3000y_1 \leq 2500 \\ -x_2 + 5000y_2 \leq 4500 \\ -x_3 + 3333.33y_3 \leq 2833.33 \\ x_1 - 3000y_1 \leq 0 \\ x_2 - 5000y_2 \leq 0 \\ x_3 - 3333.33y_3 \leq 0 \\ 0 \leq t \leq 1 \end{array}
```

Figure 6: FLP model of the problem

Conclusion

Today rapidly changing conditions of market makes it harder to take decisions. There are many uncertainties which is difficult to overcome that stimulates the studies on it. Fuzzy logic based methodologies are emerged from this pursuit.

This study focused on finding most suitable subcontractors and optimal order quantities from them. To achieve this purpose criteria for selecting subcontractor is determined. These criteria are asked to the experienced employees of the company to obtain importance degree of them. Acquired linguistic expressions are digitalized as fuzzy numbers. FTOPSIS method used found closeness coefficients which are used as coefficients of objective function in FLP. According to the results subcontractor A ranked first in the FTOPSIS. Similarly FLP gave highest quantity of order available to the subcontractor A. Although subcontractor C ranked second in FTOPSIS no order given to it due to constraint which forces to order at least 500 kg and its high paint powder usage. Instead subcontractor B has the rest of order available.

TOPSIS alone not sufficient to make a complete decision. But combining results from two methods gives more adequate solutions. In order to obtain more precise and realistic solutions more criteria and expert opinions based on these criteria are required.

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Using of Waste Marble Aggregate in Pervious Concrete

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Abstract

Pervious concrete contain little or no fine material, unlike normal concrete. The pervious concrete is used at the entrance of the buildings, in parking areas, residential roads and pedestrian pavements prevent water accumulation. In this study, the use of marble waste obtained from Afyonkarahisar organized industrial zone in the production of pervious concrete was investigated. Crushed stone and marble aggregate of 4-11.2 mm were used in pervious concrete mixture. In the production of pervious concrete, 0%, 50% and 100% by volume of waste marble aggregate were used instead of crushed stone aggregate. Unit weight, porosity, permeability and compressive strength tests were carried out on hardened concrete to determine the physical and mechanical properties of pervious concrete. As a result of the obtained physical and mechanical properties, waste marble aggregate can be evaluated in the production of pervious concrete.

Keywords: Pervious concrete, waste marble aggregate, permeability, porosity **Main Conference Topic:** Engineering

1. Introduction

Pervious concrete is a special concrete type containing interconnected pores. These pores allow the water to flow easily through concrete. Porosity, range from 15% to 35% by volume (Sonebi, & Bassuoni, 2013, Nguyen, & Sebaibi, 2014). Pervious concrete is traditionally used in parking areas, low-traffic roads, residential roads and pedestrian pavements. It is an important application for sustainable construction and to protect water quality. Because, rain water must infiltrate by underground for to be renewed. It can be occurred easily when pervious concrete are used (Yahia, & Kabagire, 2014; Jimma, & Rangaraju, 2014).

Pervious concrete consists of cement, water, coarse aggregate and some percentage of fine aggregate. Pervious concrete may have a lower compressive strength than normal concrete due to the voids. Its 28-day compressive strength is in the range of 2.8-28 MPa. Also, tensile and flexural strength of pervious concrete is less than ordinary ones due to its high porosity and lack of fine aggregates (Maguesvari, & Narasimha, 2013; Hesami, Ahmadi, & Nematzadeh, 2014; Yeih et al., 2013).

Diatomite aggregate, pumice aggregate, recycled aggregate from autoclaved aerated concrete, recycled aggregate (waste crushed concrete) can be used as coarse aggregate (Bhutta et al., 2013; Zaetang et al., 2013).

Afyonkarahisar region is at the center of the marble industry in Turkey and too much marble wastes are stored and these marble wastes harm to the environment. Therefore, waste

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marble aggregates were obtained from marble wastes were used in pervious concrete. The mechanical and permeability properties of the pervious concrete were determined.

2. Experimental Studies

In this study, it is aimed to use the marble waste obtained from the marble quarries of Afyonkarahisar province for producing pervious concrete. In experimental work, pervious concrete specimens were produced by using certain ratios of waste marble aggregate instead of crushed stone aggregate (4-11.2 mm). In the experiments, 0, 50 and 100 percent by volume waste marble aggregates were used instead of crushed stone aggregates. On the other hand, 0-4 mm fine aggregate was not used in the production of pervious concrete.

2.1 Used materials

2.1.1 Cement

In experimental work, CEM I 42.5 R Portland cement produced by Afyon Cement Plant according to TS EN 197-1 standard was used. The XRF analysis and the physical and chemical property test results of the cement were given in Table 1.

	Chemical composition (%)	CEM I 42.5 R
	SiO ₂	16.80
'sis	Al ₂ O ₃	4.81
aly	Fe ₂ O ₃	3.55
an	CaO	63.90
RF	MgO	1.94
X	Na ₂ O	0.74
ies	K ₂ O	1.24
ert	SO ₃	3.02
do	MnO	0.12
Pr	Sulfur (S)	-
cal	Cl-	0.01
imi	Loss of ignition	1.24
Che	Insoluble Residue	0.44
<u> </u>	Free Lime	1.90
cal rties	Specific gravity	3.15
Physic Proper	Blaine fineness, cm ² /gr	3320

Table 1. Cement XRF analysis, physical and mechanical property test results

2.1.2 Aggregates

In the production of pervious concrete, limestone based crushed stone aggregates obtained from stone quarries of Afyonkarahisar Kolsan ready mixed concrete plant were used. The maximum grain size of the used crushed stone aggregate is 11.2 mm. The crushed marbles used in the experimental work were obtained from various marble factories in Afyonkarahisar organized industrial zone. The obtained waste marble crushes was broken with jaw crusher and sieved into aggregates. The production steps of the waste marble aggregate were shown in Figure 1. Sieving process was carried out in order to bring the marble waste aggregate and the crushed stone aggregate to the same size. As a result of the sieving process, the waste marble aggregate was brought in the range of 4-11.2 mm like the

crushed stone aggregate. The physical properties of the crushed stone and waste marble aggregate were determined and given in Table 2.



Figure 1. Production steps of the waste marble aggregate

Table 2.	Physical	properties	of aggregates
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Physical properties	Crushed Stone Aggregate (4-11.2 mm)	Waste Marble Aggregate (4-11.2 mm)	
Specific gravity	2.694	2.550	
Water absorption (%)	0.563	0.589	
Modulus of fineness	5.33	5.29	

2.1.3 Superplasticizer

Basf master glenium 178 superplasticizer concrete admixture was used in the production of pervious concrete.

2.2 Pervious concrete mix ratios

Instead of crushed stone aggregate, the waste marble aggregate was used at 50 and 100% by volume. Since the specific gravity of the aggregates used in the mixtures are different, the aggregates were replaced by volume. The marble aggregate series were called MA50 and MA100. The series where the marble aggregate is not used were determined as Control specimens. Pervious concrete mixing ratios are given at Table 3.

Tuble 5. 1 etvibus concrete mixing ratios, kg/m						
Minture Code	W/C	Water	Cement	Crushed Stone	Waste Marble	SP
Witxtule Code	W/C	kg/m ³	kg/m ³	Aggregate, kg/m ³	Aggregate, kg/m ³	kg/m ³
Control	0.33	132	400	1448	-	4.00
MA50	0.33	132	400	724	685	4.00
MA100	0.33	132	400	-	1370	4.00

Table 3. Pervious concrete mixing ratios, kg / m^3

2.3 Types of produced specimens, curing conditions and durations

The produced specimens consist of cylinders with dimensions of 100x200 mm and cube with one side 150 mm in size. Concrete specimens were kept in the moulds for 24 hours

in a laboratory environment. Afterwards, the specimens extracted from the moulds were kept in lime saturated water at 20 ± 2 °C temperature value (standard curing environment). **2.4 Performed Experiments**

2.4.1 Unit weight and compressive strength tests

Unit weight and compressive strength tests were carried out on cube specimens with dimensions of 150x150x150 mm. All of the tests were performed at the end of 28 day curing period.

2.4.2 Porosity Test

The porosity tests were carried out on cylindrical specimens of 100x200 mm size. Porosity tests were performed at the end of 28 day curing period. The formulation used in the porosity calculation was given in Equation 1.

$$P = \left[1 - \frac{(W_D - W_S)}{\rho_w V_T}\right] x 100$$

(1) P = porosity(%) $W_D = \text{oven dry weight, g}$ $W_S = \text{submerged weight, g}$ $\rho_w = \text{density of water, g/cm}^3$ $V_T = \text{total volume, cm}^3$

While total volume is calculating, the average height (H_{avg}) and the average diameter (D_{avg}) of each specimen as the average of the four measurements recorded. This formula can be seen at Equation 2.

$$V_{\rm T} = \left(D_{\rm avg} \right)^2 \pi \left[\frac{H_{\rm avg}}{4} \right] \tag{2}$$

2.4.3. Permeability Test

The permeability tests were performed to the cylinder specimens of 100x200 mm size. Permeability tests were performed at the end of 28 day curing period. The formula used to calculate the permeability was given at Equation 3.

$$K_{\rm r} = \frac{\rm H}{\rm h} \, \frac{\theta}{\rm A(t_2 - t_1)} \tag{3}$$

K_r: permeability coefficient (cm/s)

H: length of specimen (cm)

 θ : amount of discharge water from t₁ to t₂ (cm³)

h: difference of water head

t₁, t₂ : time(s)

A: area of cross section of cylindrical specimen (cm^2)

3. Experimental results and evaluation

3.1. Unit weight results

The unit weight results of pervious concrete series were presented in Figure 2. It is seen from this figure that unit weight values of pervious concrete is change in the range of



 $2000-2100 \text{ kg/m}^3$. Since the specific gravity value of the marble waste aggregate is lower than the specific gravity value of the crushed stone aggregate, values of unit weights were decreased with the increasing of marble waste usage ratios.



Figure 2. Change of unit weight results according to pervious concrete series

3.2. Compressive strength results

The compressive strength results of pervious concrete series were presented in Figure 3. When Figure 3 was examined in general, it was concluded that instead of the crushed stone aggregate, the compressive strength decreases with the use of marble waste aggregate by volume. It was observed that the compressive strengths change in the range of 20-27 MPa.



Figure 3. Change of compressive strength results according to pervious concrete series

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Figure 4. Relationship between compression strength and unit weight results

The relation between the compressive strength and unit weight was presented in Figure 4. It can be understood from the figure that, the compressive strength decreases in parallel with unit weights. It was concluded that there is a strong correlation between compressive strength and unit weight results as seen from obtained correlation coefficient.

3.3. Porosity results and evaluation

The alterations of porosity of concrete series were provided in Figure 5. When Figure 5 was examined, it was seen that the porosity results increase with the increase of marble aggregate usage rates. It is thought that the cause of the increase is the marble aggregate has a more porous structure.



Figure 5. Change of porosity results according to pervious concrete series





Figure 6. Relationship between compression strength and porosity results

The relation between the percentage of the porosity and compressive strength of the specimen was given in Figure 6. It is obtained that there is a strong relation between porosity and the compressive strength of the specimen. As a result, the values of compressive strength decrease with the increasing of porosity results.

3.4. Permeability coefficient results and evaluation

Permeability coefficient of pervious concrete was presented in Figure 7. It is observed that the permeability coefficient is alter in the range of 0.40-0.49 cm/sec. It is observed that the obtained values are close to each other. However, with the use of the marble waste aggregate, the permeability values were slightly increased.



Figure 7. Change of permeability coefficient results according to pervious concrete series

The correlation between the permeability coefficient and porosity results were provided in Figure 8. It is obvious from this figure that the values of permeability coefficients increase by the increase of the porosity values.





Figure 8. The correlation between the permeability coefficient and porosity

4. Results

It is obtained from the experiments that unit weight of produced pervious concrete is nearly 2000 kg/m³ and compressive strength is between 20-28 MPa. It is concluded from those physical and mechanical properties results that it is possible to use marble waste aggregates in production of pervious concrete. Moreover it is observed that the porosity and permeability values are increased by the usage of marble waste in pervious concrete. These results are thought to be due to the fact that aggregates obtained from marble wastes have a more porous structure, as can be understood from their specific gravity values. It is obtained from the results of this study that; it is possible to decrease the negative effects of the waste produced from marble factories in Afyonkarahisar region on the environment, in case these waste are used in the production of pervious concrete the sustainability of the underground water will be supplied and this would lead to increasing environmental sensibility.

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Investigation of Using Carbon Fiber in Production of Conductive Mortar

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Abstract

In this study using carbon fiber in mortar production was investigated. Mortar series with carbon fiber were produced by using carbon fibers with 0.0, 0.3 and 0.5 % of cement weight. In order to determine mechanical and electrical properties of mortars with carbon fiber additives, compressive strength, electrical resistivity and conductivity test were performed on hardened mortar specimens. It was concluded that with the using of carbon fiber in the Portland cement mortar mixes leads to increase of electrical conductivity of the mortars.

Keywords: Conductive mortar, carbon fiber, electrical conductivity. **Main Conference Topic:** Engineering

1. Introduction

Human has been used a variety of construction materials to build civilization for thousands of years. Portland cement is one of the most commonly used construction materials to construct bridges, roads, buildings, dam and infrastructures. In recent years, electrical conductive technology used for to prevent icing on the road and other surfaces via resistance heating, electromagnetic interference shielding, and thermoelectric energy generation and also for cathodic protection of steel reinforcing bars in concrete. (Tumidajski, 1997; Chung, 2004; Bertolini et al., 2004) Materials which are passed the electric and heat energy called as conductive material. Electrical conductivity in materials at atomic sizes was performed by "load-bearing elements". These are electrons or electron space. In order to high conductivity, resistivity must be low (Huang et al., 2009; Pan et al, 2014). According to the conductive polymer composite theory, conductive mortars reaches the low electrical resistivity by way of conductive constituents are added to their inside such as shape of powder, fibers or and particle (Garci'a et al., 2009, Pan et al., 2014). When the constituents are added to cement mortar mixtures to provide the desired conductivity also required that cement mortar mixes meets the specification limits and must be economic. In this study using carbon fiber in mortar production was investigated and it was concluded that with the using of carbon fiber in the Portland cement mortar mixes leads to increase of electrical conductivity of the mortars.

2. Experimental Studies

In this study, it is aimed to research the effect of carbon fiber usage on the mechanical and electrical properties on mortars. For this aim mortar specimens including different rations of carbon fiber (0.0, 0.3 and 0.5%) were produced.



2.1 Materials

2.1.1 Cement

In this study CEM I 42.5 R type Portland cement obtained from Afyon Cement Factory (ÇİMSA) was used in mortar specimens as cement. The XRF results and physical properties of the cement were given in Table 1.

	Chemical composition (%)	CEM I 42.5 R
	SiO ₂	16.80
Sis	Al ₂ O ₃	4.81
aly	Fe ₂ O ₃	3.55
an	CaO	63.90
RF	MgO	1.94
X	Na ₂ O	0.74
ies	K ₂ O	1.24
ert	SO ₃	3.02
do.	MnO	0.12
Pr	Sulfur (S)	-
cal	Cl-	0.01
imi	Loss of ignition	1.24
Che	Insoluble Residue	0.44
<u> </u>	Free Lime	1.90
Physical Properties	Specific gravity	3.15
	Blaine fineness, cm ² /gr	3320

Table 1: Cement XRF analysis and physical property test results

2.1.2 Carbon fibers

Carbon fiber was used by cutting as 5mm length in the production of mortar specimens. The specific weight of the carbon fiber is determined as 1.78. The carbon fiber properties were shown in Table 2, picture belonging to the carbon fiber used in the production of mortar specimens was given in Figure 1.





Figure 1: Carbon fibers in the production of mortar specime	ens
Table 2: Carbon fiber engineering properties	

Fiber Properties	Value	Test Method
Tensile Strength (MPa)	4900	ISO 10618
Tensile Modulus (GPa)	250	ISO 10618
Strain (%)	2.0	ISO 10618
Density (g/cm3)	1.78	ISO 10119
Yield (g/1000 m)	1600	ISO 1889

2.1.3 Rilem Cembureau standard sand

The details of provided in TS EN 196-1 (2009) specification Standart Rilem Cembureau sand was used while preparation of mortar mixtures. The standard sand was produced by Trakya Cement Plant of Limak Western Cement. The granulometry, and properties of standard Rilem Cembureau sand were presented in Table 3 and Table 4 as respectively.

Sieve size (mm)	2.00	1.60	1.00	0.50	0.16	0.08
Cumulative remained material (%)	0	7±2	33±2	67±2	87±2	99±1

Physical properties	Rilem Sand (0-2 mm)	Carbon Fiber		
Specific gravity	2.600	1.78		
Water absorption, %	1.276	-		

Table 4: Physical properties of component of mortar

2.2 Mortar mixing ratios

Carbon fibers were used in proportions of 0.0, 0.3 and 0.5% of the cement weight while preparing mortar mixtures. The series in which carbon fibers are not used are called as control. The series in which carbon fibers are used are called as 0.3% CF and 0.5% CF, respectively. Mortar mixing ratios was given in Table 5.

Mixture Code	Cement	Water	Rilem Sand	Carbon Fiber
Control	507.28	253.64	1521.83	-
0.3% CF	507.28	253.64	1519.61	1.52
0.5% CF	507.28	253.64	1518.13	2.54

Table 5: Mortar mixing ratios, kg/m^3.

2.3 Specimen type, curing condition and duration

The specimens were produced as shape of prism with dimension of 4x4x16 cm. The mortar specimens were kept in mold in the laboratory along 24 hours. Afterwards, the specimens were kept in lime saturated water at 20 ± 2 °C temperature (standard conditions). The Picture of produced mortar specimens were given in Figure 2.



Figure 2: Produced mortar specimens

2.4 Test methods

2.4.1 Compressive strength test

After the specimens were cured along 28 days, compressive tests were performed on the specimens taken from prismatic specimens with dimension of $4 \times 4 \times 16$ cm.

2.4.2 Electrical resistivity measurements via two probe method

The electrical conductivity test performed prismatic specimens with dimension of $4 \times 4 \times 16$ cm. Electrical conductivity tests were performed at the end of 28 day curing period. The experimental setup was shown in Figure 3.

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Figure 3: The experimental setup of measuring of electrical resistivity

A power supply (GwINSTEK SPM-6003) and a digital multimeter (Fluke) were employed to measure resistivity. The electrodes made of copper sheets were stuck to the cross profiles of a specimen by mechanic clamp (see Figure 1). The stabilized power supply and digital multimeter were connected to the copper electrodes by the wires with crocodile mouth. Subsequently, the resistances under constant voltage (30 Volt) were measured. Resistivity (ρ) and conductivity (C) of specimens were calculated according to the equation 1 and 2 as respectively.

$$\rho = R \times \frac{s}{L}$$
(1)
$$C = \frac{1}{\rho}$$
(2)

where ρ = electrical resistivity (Ω cm); *L* is the internal electrode distance (cm); *R* is the measured resistance (Ω); and *S* is the electrode conductive area (cm²). In order to electrode distance, specimen height were measured three different point and their average heights were used as *L* value

3. Test results

3.1. Compressive strength test results

Compressive strength results change according to the mortar series was shown in Figure 4. When Figure 4 is examined, it is concluded that the results of compressive strength are very close to each other. The values of compressive strength range from 42 to 43 MPa as approximately. With the using of carbon fiber in mortar specimens, it was determined that the compressive strength was decreased.



Figure 4: Compressive strength change according to the mortar series

3.2. Electrical resistivity test results

Electrical resistivity change according to the mortar series was given in Figure 5. It was concluded that with the increase of using rate of carbon fiber in mortar specimens, electrical resistivity of the specimens also decreased as shown in Figure 5. With the increasing of carbon fiber in the mortar mixture, decreasing ratio of electrical resistivity values were also increased compared to control series.



Figure 5: Electrical resistivity change according to the mortar series.

3.3. Electrical conductivity results

Electrical conductivity change according to the mortar series was given in Figure 6. With the increase of using rate of carbon fiber in mortar specimens, electrical conductivity of the specimens also increased as shown in Figure 6. With the using carbon fiber as 0.5%, electrical conductivity values were increased by about 54% compared to control series.





Mortar Series

Figure 6: Electrical conductivity change according to the mortar series.

4. Conclusions

With the use of carbon fiber, compressive strength of specimens decreased at very low rate. It was concluded that, when carbon fiber is used, the mechanical properties of mortar specimens would not be affected as negatively. With the use of carbon fiber in the mortar specimens electrical resistivity value was decreased and conductivity is increased. The test results shown that using carbon fiber in the production of conductive mortar is very useful and can be use in application of conductive mortar.

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Feasibility Assessment of Replacing Centralized Power Generation with Distributed Energy to Reduce Carbon Emissions in Kinmen under the Context of Climate Change

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Abstract

Human activity is the main cause of global warming since the mid-twentieth century. Small islands are especially vulnerable to the consequences of climate change. Therefore, the development of small islands require flexible strategies that consider local conditions.

After military administration was lifted in Kinmen, and the gradual development of policies between Taiwan and China has eased cross-straits relations, "Little Three Links (open up postal, transportation and trade links between China and Taiwan)" were established between Kinmen and Fujian. Since then, increasing numbers of mainland tourists have been allowed to visit every year, which has transformed Kinmen from a battlefront to a popular tourist destination. In light of the plan announced by the Government of Taiwan, which selected Kinmen to be a low-carbon demonstration island, this study proposed the idea of utilizing inactive military installations for the production of renewable energy. In the military site setting, a power generation system for decentralized energy provision is suitable for Kinmen. This development would largely reduce the dependence on the fossil-fuel power station currently used in Kinmen. In this study, a plan was developed to coordinate the gradual release of military installations and provide a framework for the re-purposing and development of the sites.

Keywords - cold war, military installation, decentralized energy, concentrated power.

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I. INTRODUCTION

In recent years, global warming has caused a series of natural disasters. Kinmen, a small archipelago of several islands with an area of 150 km2, is also threatened by the effects of global warming. As Kinmen lacks natural resources, its development is largely controlled by ecological and cultural factors. Management without a long-term aspect will jeopardize its environment. Therefore, a sustainable management plan is required for Kinmen in order to address recent dramatic changes and bring about a bright future.

With falling tensions between Taiwan and China, a reduction in military presence and the opening of Kinmen have led to increasing tourism, as Kinmen is rich in battlefields and

historical sites. Tourists are fascinated to witness historical venues of the Cold War, and the number of tourists visiting Kinmen has dramatically increased, especially over the past decade[1]. During the 43 years of military administration, large numbers of various types of military facilities were constructed on Kinmen, including forts, barracks and bunkers. This renders Kinmen an extremely rare historical battlefield site, as it has such a high density and variety of military installations. After military administration was lifted in Kinmen in 1992, reduced troop numbers, deactivation of military installations, and demolition of military bases were observed for many years. The changes meant that Kinmen, a place that used to be a world-famous battlefield, began to fade into obscurity [2]. Previous magistrates of Kinmen have attempted to promote it as a tourist destination. However, the large influx of tourists has worsened the shortages of electricity and water. Therefore, the effects of changes caused by historical and temporal transformation have led people on the islands to rethink the future development of Kinmen, which should also take into account the conservation, re-activation and reuse of historic sites. Additionally, residents of Kinmen are becoming aware of the importance of the protection of the ecological environment and low-carbon living, which are important for sustainable management. In the plan, Kinmen was chosen to become a lowcarbon demonstration island. Therefore, Kinmen is keen to participate in this important global issue, which fits with its goal of sustainable development. In this article, the concept and a proposal for the development of Kinmen as a low-carbon island are described. The plan focuses on how to make the best use of inactive military facilities that are to be modified and utilized for tourism, leisure, environmental protection, and educational purposes. The aims of this study were to consider the reuse of inactive military facilities and design a plan detailing how to develop the sites that are being gradually released by the military, and modify and convert them in order to achieve the low-carbon target of Kinmen [3].

Π VISION AND STRATEGY

The principle goal of this study was to formulate a plan to save energy and reduce waste by reusing inactive military facilities in Kinmen to develop sustainable energy resources. This plan will avoid many inactive military facilities sitting idle for years or being demolished. Although some sites have been converted to museums or non-military training grounds, the majority of the closed sites remain idle or have no clear plan for reuse. Therefore, the plan proposed in this study is the first to detail not only the development of clean energy resources on Kinmen, but also the maintenance and reuse of inactive military facilities [4]. The plan presented in this study describes the reuse of Kinmen's unique resources to develop lowcarbon power sources, which is likely the best solution to cope with the large number of inactive military installations.

Conception

There are currently 163 village communities that have military installations inside or around the communities. This study first recorded their positions using a global positioning system (GPS) and collected data regarding the numbers of residents and the total electric power consumption in each community. The data were then used to determine the type and capacity of wind and solar power systems that should be installed[4]. The design uses a decentralized energy system that allows for more optimal use of renewable energy as well as reduces fossil fuel use and increases eco-efficiency (Fig. 1).



Figure 1. Replace Concentrated Power Plant With Distributed Generation System. (Data sources: the current study)

Strategy

The type of power system to be installed must be suited to the different sizes and orientations of the various military facilities. In general, small bunkers are suitable for vertical-axis wind turbines of 10 kW or higher, while lager military bases can support solar and wind hybrid power systems. Each site is a node of distributed energy resources, and will be managed and coordinated within a smart grid operated by Kinmen Power Company. It is estimated that 200 permanent members of staff will be required to maintain the distributed energy system, and the profit obtained from the use of renewable energy over fossil fuel usage would cover this cost [4].

A. Wind power

As land acquisition is not easy, and shipment times are long for service parts, large wind turbines are not recommended for Kinmen. At a height close to the ground (<10 m), the wind speed and direction are not stable, and therefore small horizontal-axis wind turbines are also not suitable for Kinmen. Medium-size vertical-axis wind turbines are not affected by the wind direction and can be easily installed on the sites of military installations near villages. These vertical-axis wind turbines are most suitable for the nature of Kinmen's gusty conditions and the cost can be significantly reduced as the land and wiring requirements are minimum [5].

B. Solar power

In inactive military installations near village communities, such as rooftops of buildings and open spaces, solar power systems can be installed to generate electricity for the villages. The settings are flexible as long as the space is sufficient. As solar power systems are located by villages using distributed power system, no long-distance transmission system is required. This saves the high cost of long-distance wiring used in centralized power systems and reduces the energy lost owing to the resistance of the wires.



Proper capacity of power generation system will be installed in the military facilities near settlements according to the size of the village. In the setting proposed in this study, each power generation system installed on the site of a military facility is a local node of the distributed power network, which can provide a more stable power supply than a centralized power system [6]. Although centralized generation has dominated the power industry for decades, distributed generation facilities closer to the customer are becoming a modern trend, as they are more cost-effective and can maximize the benefits of renewable sources. With integration with a modernized smart grid, which provides a higher reliability, availability, and efficiency during power disturbances, renewable energy and the distributed power system can be employed at their maximum potential. As the aim is to obtain the maximum effect for the energy produced, the development of a smart grid is essential to save energy and is undoubtedly the best option [7]. Therefore, the combination of a smart grid with renewable energy sources is necessary for Kinmen in the development of a new power system.

C. Water resource

Water shortage is always a problem for Kinmen, as water evaporation (1,684 mm) is greater than precipitation (1,047 mm). Rainwater harvesting to replenish surface water and groundwater is very important for Kinmen. This study proposes the use of underground bunkers for rainwater storage. Most of the inactive military bunkers are underground or partly underground, and are often not suitable to be reused for other purposes (Fig. 2). Safety and liability concerns also exist if they are left abandoned. By using these bunkers for rainwater or reclaimed water storage, the historic structures of the Cold War will be kept from being demolished. The rainwater harvested can then be used for agricultural purposes.



relationship between the

air-raid shelters and their proximate residences . (Photo by H.-Y. Liu 2015)

III. EXPECTED EFFECTS

The

2

Figure

Of a total of 511 military sites, Kinmen Defense Command is planning to release 241. Of those that have been released already, most have been left abandoned; some are used as battlefield heritage galleries, and some are employed for entertainment purposes, such as outdoor paintball fields. With an increasing number of sites being released, more will be demolished due to oversupply. Therefore, this study proposes that these inactive military sites are used to develop renewable energy sources for Kinmen, which optimizes the use of the military facilities.



Currently, Kinmen depends on fossil fuel shipped from Taiwan, and 17 million tons of CO2 are generated by Kinmen annually through the use of the conventional power station. Demolition of inactive military facilities is of little benefit to Kinmen, as increased building waste will become an environmental burden and damage the ecosystems of Kinmen. In terms of carbon reduction, there is no advantage to the removal of military constructions, as this does not reduce waste or save energy. By using these sites to develop a smart grid that uses distributed energy, i.e., installing grid-connected devices at each inactive military facility and making them power nodes to generate and/or store electricity, the system will be of higher efficacy than the conventional centralized power station in terms of supplying energy for nearby villages, which will significantly reduce the use of fossil fuel. In addition, development also conserves inactive military facilities and prevents them from being demolished, therefore leading to carbon reduction [8]. If the numerous idle military constructions in Kinmen can be reused to integrate solar and wind energy as well as conserve water, more renewable electricity will be generated, and the water resource will be increased. Furthermore, the installation of abundant vertical-axis wind turbines and photovoltaic modules will create a special local landscape with a positive effect on the environmental aesthetics. Therefore, an additional sightseeing potential will be created, as visitors will be able to view the aesthetic character of Kinmen in addition to the development of renewable energy from the air when planes approach Kinmen airport [4].

IV. CONCLUSION

In summary, the initial plan is to employ solar and wind energy to achieve the key goal of using renewable energy to develop Kinmen as a low-carbon island. In order to promote sustainable tourism in Kinmen, maintaining the natural environment as well as the historical and cultural characteristics are the best ways to achieving a high-quality environment with a low density of tourists. To achieve this goal, active participation of the general public and the support of the government will be required. Currently, Kinmen has all the key factors needed for development. The integration of inactive military facilities and renewable energy will reduce the use of conventional fossil fuel, which will significantly reduce greenhouse gas emissions. In addition, the reuse of idle facilities will give them new life and attract tourists, which will have a positive effect on the tourism industry in Kinmen. The plan proposed in this study aims to develop independent energy sources for islands by integrating inactive military facilities and renewable energy. This sustainable development of Kinmen is a unique example, and will help to foster the renewable energy industry in Taiwan and promote its international competitiveness.

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BIOGRAPHY

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Dr. Liu has participated in Ministry of Science and Technology projects, is an important member of government reviews of engineering plans, and continues to be actively involved in Kinmen island's advance planning for low-carbon emissions.

In addition to teaching, he is actively promoting and researching building energy efficiency and the application of renewable energy in construction projects.

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Confidence is the new basis for modern leadership

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Abstract

Are the well known forces of leadership still used in modern leadership or are they just some remaining factors which can be surely used and which are still existing, on the other hand, most of them are not really used anymore. Today the picture of value had changed in the head of the employees. Not rarely things same as work-life balance became more important than making career. More freedom in the daily work-time became more important than getting a better salary. A nice environment will be created to promote innovative ideas.

In such a time, is there really a place for forces of leadership same as threat & punishment or just of legitimation? Haven't we just passed the time where these kind of forces had been replaced by other ones.

Keywords: Confidence, Modern Leadership, Management, Forces of Leadership

Main Conference Topic: Management

Introduction

The basis for this research is the idea of a confidence based leadership which should be an important part of each human management method. In eyes of the author, confidence is not only a part, which modern managers have to take into account when they try to manage their employees. From author's point of view, it's one of the basic forces of leadership, which is needed on every kind of management level.

Confidence seems to be the missing force of leadership, which is really relevant on each kind of management level. So that's the reason why French & Ravens "Forces of Leadership" will be researched into the direction of confidence and its own position of between the well known factors.



Leadership Forces

Very early but still taught and published, French and Raven (1959) divided five categories of leadership forces, but these forces are not ranked by each other, as shown below. It was meant, that these forces can be shared and combined by each other and that each kind of combination results as one specific kind of a leadership method. From the other way around, each specific management method can be separated into the before mentioned categories.

From the experiences of the author, the personal relationship between manager and employee becomes more important, the higher the management level is. On the other side force elements same as threat / punishment or just legitimation shall not be used to lead high-level managers.

- 1.) Force due to threat / punishment
- 2.) Force due to legitimation
- 3.) Force due to information advance / knowledge and skills
- 4.) Force due to gratification
- 5.) Force due to personality / character

(The force of information advance is later detected by Raven and Kruglanski (1970) and sometimes mentioned as the 6th force of leadership. The author sees the ,,knowledge/skills" force also as a knowledge-based force, that's why it's combined here.)

Authors Leadership forces

Independent from the ranking of the leadership forces shown before, the author detected in many years of leadership, that most of the forces of leadership became more and more irrelevant the higher the management level is.

Compared with French and Raven's forces of leadership and its further developed variations, the author came to the hypotheses, that the single forces have not only their defined importance ranking as shown above. Also the item "confidence" became more and more important in last decade of leadership and should be in the eyes of the author a single standing force of leadership, because the 2nd hypotheses is that leadership on a high management level will not work without confidence.

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Figure 13: forces of leadership by author, based on French & Raven

Leadership Force "Confidence"

Luhmann (2000) is saying, that human is only capable of acting when it's possible for them to reduce the numbers of information, so the confidence of the leader to the employee reduces such information and gives the possibility to work with more information. Or based on a more global point of view, same as Coleman (1990) interprets Simons (1964,1957) view of the rational choice theory: It's impossible, to act just on hard facts. The actor must have confidence in his own decision, based on the experiences he made by himself. This is similar or same than to decide on information, which are coming from another person or employee. In most cases the manager decides not on its own information. He must have confidence to the other person, where the information is coming from.

So confidence seems to be a must and if confidence is not a basic source of the management forces, why doesn't work new leaders with the old staff of its forerunner? Just have a look at the politics; here it's normal that new leaders start working with a staff, they can trust.

Based on the theory that confidence is a Leader-Member-Exchange, e.g. LMX-Model (Graen, 1976), both parties must interact to create confidence and the manager has to start this progress. In addition the problems on this management level are much too complex, that



they could be solved efficient without confidence. - Confidence reduces the complexity of human acting, expands in the same time the possibility of experience and acting and gives safety (Luhmann, 1973). So the employee must be led with confidence to be efficient and with the 2nd hypotheses it is an absolute must to lead with confidence, because if the employee is not able to trust the manager, the relationship will end. Same result we have the way around.

Based on these facts, the author implemented the factor confidence into the graph of the ranked forces of leadership and put it based on the necessity of being, more to the positive, right side and it is expected, that every good relationship between manager and employee has a high share of this confidence force.

Result: The position of confidence

To find the correct place of confidence into the ranking of the before mentioned forces, is not so difficult as it seems and is based on the following basics:

1.) Threat / punishment – will have no or nearly no influence in a stable manager / employee relationship. Here we are on the very left, better to say negative side, which shall be not used as a modern leader. The more important is the situation of the employee, especially on high management level. If he got the feeling of being threated, he will leave the company. On the other hand, everybody, who has the possibility to work on a high management level, knows how hard and long the way was until this management level was reached. So he made his own experience, what the result of a disappointment was. So the employee doesn't need this force of leadership. The person makes this kind of pressure by himself.

2.) Legitimation – with this kind of force only average or bad manager will work with. Especially on high management it will not reach in daily business that the manager says: "I'm the boss, because I'm on this position now. So you have to follow me." If a manager wants, that the employees will follow him, it's not enough to say words, it's needed to live the own words. The manager must be a paradigm, who can convince with experiences and facts instead of trying to convince people, that everybody has to follow, just to the reason, that he is siting on the boss' chair. Due to this and the situation, that most managers on high-level management should be aware about the circumstance, this kind of force is expected just with a minor share.

3.) Information and knowledge – is as explained before a more important factor than the legitimation. It's good for the employee, same as for the manager, if the last one has a good knowledge basis. Combined with experience on products, same as the experience with other colleagues, customers or suppliers, it will help the manager to convince its employees that they will do as it's wished. So normally this should be one of or the most important factor in leadership. The problem with this factor is, that its lifetime is limited and so this factor of leadership is consumed very fast. Today, the employee is very good trained. Often the employee has a better education, than the manager and latest after some years of making own experiences, the employee gets the feeling, that he can do the job of the manager, too. Due to that, this kind of force of leadership can be just used in short- and mid-term relationships, never as a long-term force of leadership.

4.) Personality – is something, not to say god given, but something, which can't be really trained. If managers have this kind of force of leadership, that employees want to get a friend of him, want to work with the manager and not because of money, than a manager can be very happy. If this kind of factor could be easily trained, probably it would be the most interesting one. The one which would be mostly used from the managers, but that's not



reality. It's not a question of training, the general basis for this is something everybody wants to have but just a few persons really have. That's the reason, why also this point is expected with a lower share.

5.) Gratification – is one of the two factors, which are really important in the today art of leadership. It's possible to work with this factor on short-, mid- and, the most important, on long-term basis. The gratification, can be a bonus, a higher salary, more holiday, a firm car, a better job, more freedom for decision, a higher responsibility,.... This kind of factor can be made transparent, can be used on every manager or employee level. The worker gets 20% more loan, if he assembles 120 instead 100 parts each hour and the high-level employee/manager gets a better firm car, if a project is finished much faster than calculated. This force of leadership can and should be used every time, when a performance shall be improved.

6.) Confidence - is very near in the area of personality, but the big difference is, that whit this factor, both parties can work with. If the manager has confidence to the employee, he can make decisions faster, because he doesn't have to check each work of its employee. The employee will work more independent, because he knows, that he has the confidence of the manager. He learned how the manager thinks, has the experience what's bad and good in the eyes of the manager, and gets by this every day the experience that the manager has confidence to him. Everything between the manager and employee is transparent and because of this the output of decisions and so on looks logical in the eyes of the other. So there are some special ways of confidence, starting by the first level "I trust him/her, because what he/she makes is good for me" up to the last level, which can be often found in a marriage or an old friendship "I trust him/her, because I know her/him so good and long, that I would follow him also when I don't know the reason". So independent of the stage or level, confidence must be there, otherwise decision would take to long, if everything has to be controlled and/or double checked. The daily business is much too complicate, that the manger has time and/or knowledge to check everything. So if the manager has no confidence to the employee, the relationship and as a follow up the leadership will not work over time.

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So the distribution of the forces will look something as follow:



Figure 14: share of leadership forces

In addition, with this ranking a positive / negative ranking can be established. The background is, that there are forces (positives), who can be easily accepted by the employee and who have a positive influence onto the relationship between manager and employee.



Figure 15: positive ranking of leadership forces

An additional idea is that different kind of management-level have a different share of these forces. So in general it's wished, that both kind of management levels, shopfloor, same as CEO-level, should have the same (positive) management style. But in reality it's expected that low-level manager are in comparison to the high-level manager on the left (negative) side. That means based on these six categories the following kind of positive or negative effect for leadership.

	Treat / punishment	Legitimation	Information & knowledge	Gratification	Confidence	Personality
Management level	low	\$				high
Management style	negative	<				positive

Table 1: influence of management style and level

With this ranking it can be proven, how the direct employee feels the leadership of the boss, just by asking boss and employee in the survey and it can be done in both management levels, high and low. It can be shown, what kind of forces of leadership are really used and relevant in a modern leadership.

Conclusion

Confidence seems to be a must. It seems to be the new basis of modern human leadership. It has to be checked, if its position is as it is expected and for sure also the position of the other, well known forces. Perhaps will some surprises occur in future but with the consideration of this paper it's clear, that confidence will have an important role. No to forget, that confidence is until today just beside mentioned add-on in the todays art of leadership. Confidence is a factor which is needed everywhere, in private or business life. Just have thought at your most important people / friends in your private life. Would they same important for you if you would have no confidence into them? – So confidence is a must and it makes decision processes faster, better to say it's faster so it's more efficient and so it brings more money.

But as explained before it's not only important in case of efficiency, especially in high management positions, most decisions will be done on results of other people. – How to do so if there is no confidence to them?

Confidence as the new relevant force of leadership has to researched furthermore, but with this paper the relevance should be more transparent now.
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Modeling the Technology Diffusion by Using Bass Model

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Abstract

In order to propel the global competitiveness of precision machinery industry (PMI) in the era of modern innovated economy, it is essential to explore the technology diffusion in PMI not only to pursue advantages in global manufacturing industry, but also to seek the sustainability in modern engineering technology. This study adopts Bass's (1969) model to estimate technology diffusion in PMI, which includes three parameters of innovation coefficient (p), imitation coefficient (q) and potential market size (m). By simulating the parameters, this study finds that innovators can promote the innovative activities in industrial clusters because of geographical features; however, imitators can also imitate and improve their competitiveness by lower labors and costs. The most important factor affected by diffusion is distance, where the diffusion rate on the coordinate appears as a distribution of binary function. Finally this study contrasts the findings with Rogers's (1962) diffusion of innovation (DOI) theory.

Keywords: Bass Model, Technology Diffusion, Diffusion of Innovation (DOI), Industrial Cluster

Main Conference Topic: Management, Organizational behavior

Introduction

The standard of precision machinery technology reflects a country's industrial and technological strengths. Since new technology is developing at an astonishing rate across the world, technological diffusion is becoming an often discussed issue in countries and regions. Furthermore, industrial clusters contribute to establishing satellite systems, which construct corporate and synergy systems. In each stage of production and contained in the division of labor, a close relationship is maintained, while cooperation in the industrial clusters can raise productivity and efficiency. Krugman (1991) indicates that an industrial cluster is a group of companies with the similar industries which have the same economic activity in the same geographic region. To some extent, the commercial activity of the industrial cluster will affect the supply chain, technology research and market (Krugman, 1995), and thus promoting the PMI to make the necessary technological transitions, upgrades and restorations is essential for PMI.

Technological innovation is uncertain and may directly cause problems in the process of technology diffusion (Dosi, 1982). The concept of technological innovation can be separated into diffusion of innovation (DOI) and diffusion of technology (DOT). Roger (1995) defines diffusion as innovation through different channels within members of a social system, and that this process is restricted by time and space. Accordingly, Mansfield's (1961) study separates the scope of technology diffusion from the cluster as inter-firm diffusion, intra-firm diffusion and overall diffusion. Scholars and literatures have been exploring the process of adopted technological innovation, which emphasizes the influence of potential adopter's interaction. As time goes by, technological innovation has been developing, and



geographical space limitation has been decreasing by the diffusion of technological innovation. Capello (1999) considers that regional internal neighbors have advantages on the process of collective learning since clusters can share information and improve their technologies; and in doing so through technological innovation and diffusion, the construction of industrial clusters will succeed.

Many firms still suffer from uncertain innovation to measure the competitiveness of technology diffusion. The purpose of this study is to measure technology diffusion by using Bass's (1969) model. Since technology diffusion is related to the spread of technological innovation in the market, it does not only focus on deriving technological innovation but emphasize the technological ability of manufacturers. This study focuses on internal diffusion and external diffusion and uses the innovation coefficient and imitation coefficient of Bass's model to simulate the adoption of technological innovation. According to expert interviews, this study also discusses some influential factors associated with technology diffusion, which is a feature of the technical industry and manufacturers.

Literature Review

In the process of technology diffusion, there are five stages: awareness, interest, evaluation, trial and adoption (Bohlen and Beal, 1957). PMIs rely on sophisticated technology and flexibility, while the progress of new technology affects the market as the flexibility of the market helps technology diffusion, and the market needs may accelerate the diffusion of technology. Also, DOI theory has four important factors: innovation, communication channels, time and social system. As a result, this study discusses the feature of manufacturers in PMIs.

Industrial Cluster of PMI

From the scope of the PMI, it can be regarded as related industries from upstream to downstream on the supply chain; that is to say, from manufacturing processes, technical support or support services, to product manufacturing (Tony, 2002). The PMI has been moving toward intelligent and high-value development. In recent years, through the rapid changes of the industry environment and competitiveness in the world, "short delivery" and "mass customization" have already become the PMI's strong influence. Kotler (2000) defines an industry cluster as a group with positive vertical and horizontal links of industry, and also stresses that if an industry can be clearly divided by the relation into input and output, its development is in a vertical direction; while vertical links can be divided into forward and backward links. The forward link is the link between focus industry and upstream industry; however, the backward link is the link between focus industry and upstream industry. The composition of an industrial cluster can accelerate to knowledge and technology diffusion in the cluster, which promotes the productivity of manufacturers in a cluster (Gordon & McCann, 2000).

According to Breschi and Malerba (2001), industrial clusters will result in technology interdependence or merger. However, technology diffusion and the accumulation of knowledge are due to important factors in the exchange of each other's technology. By being community members, they can exchange their knowledge, technology or learn from each other, so it can be said that through the knowledge and skill levels within the professional region, members can co-produce products through professional information and technical exchanges by inter-industry efforts in clusters. Porter (1990) thinks that special geographical positions will result in the accumulation of technology and spread outward. As a result, many companies are competitive with each other in the same areas. Cooke (2001) considers that industry clusters can enhance the knowledge spillover in technological innovation. Through the unrestricted flow in clusters, inter-companies reach exchange and access of knowledge



directly. Also, through trade exhibitions or technical journals, many manufacturers can imitate each other and result in the knowledge spillover.

Diffusion of Innovation and Bass Model

Rogers (1962) indicates that only if an individual or a unit adopts a new idea, technology or entity, is it called an innovation. Also, in 1983 he illustrates further that if an idea is new for a person, it can be called an innovation. Originally, the concept of innovation is proposed by the economist Schumpeter (1934), using the economic perspective to define innovation: "Apply, invent and discovery, promote economic development." The scope of innovation raised by Schumpeter is organizational innovation and technological innovation. After that, scholars have put forward successively the relevant definitions of innovation, which include Higgins (1993), who considers that innovation is the inventive process of a person, group, organization, industry and society that will bring the greatest value. Drucker (1985) defines innovation as the wealth that new capabilities give resources, and the proposal of innovation lies in using new knowledge to offer products and services that customers need. The early scholars have extensive definitions of innovation, along with a popularization of the concept.

In Damanpour's (1996) review on rhetoric, Damanpour considers that innovation has multi-levels, and innovation is a process or an outcome. Damanpour (1991) also indicates that innovation is a new product or service, new process technology, new management system and structure, or plan in members. Therefore, technological innovation is needed in organizations. Holt (1985) uses the angle of knowledge creation to define innovation as the course of the relevant knowledge and information of creating new things. The degrees of knowledge innovation are closed with organization performance (Han et al. 1998); that is, the more effective the organization is, the more effective its knowledge innovation will be. Knowledge can be viewed in a group, an individual, an organization and different levels of planned, systemic and meaningful learning. Based on knowledge innovation, technology diffusion will occur after technological progress and technological innovation. With the shorter product life cycles, technology varies rapidly according customer needs, if enterprises want to survive, they must update their capabilities to continually improve organizational flexibility. Technological innovation is usually the main method of business and driving force of enterprises, and it plays an important role in the management of R&D. Successful innovation can be profitable for the company to promote the growth of customers and enhance customer loyalty in today's era of rapid market changes, and enterprises have longterm technological innovation abilities which is most important for a competitive advantage (Prahalad & Hamel, 1990).

Diffusion of innovation (DOI) is a theory that seeks to explain how, why, and at what rate new ideas and technologies spread through cultures. Rogers (1995) mentions that diffusion is the process in a certain period of time, through specific channels of communication, a social system in the process of communication between members, and the ultimate goal is to innovate and spread new things in the social system. That is, DOI is the process of technological innovation through the communication to organizations, which enables members to adopt and become users. DOI has four important elements that influence the spread of a new idea: the innovation, communication channels, time and social system. The innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption. Communication channels need to be a two-way process of convergence, rather than as one-way linear acts in which one individual seeks to transfer a message to another in order to achieve certain effects (Rogers & Kincaid, 1981). The time means that the innovation-decision period is the length of time required to pass through the innovation-



decision process (Rogers, 1995). A social system is defined as a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal.

Bass (1969) divides consumers into innovators and imitators according to consumer durables. Some adopters in a social system are not affected by others and decide by themselves, and this type of adopter is usually called an innovator. Mahajan et al. (1978) suggest that the main purpose of the diffusion model is to show the degree of diffusion and its innovative behavior through a group of expected adopters over time. This model can depict the increased number of adopters successfully and expect the diffusion process continuously in the future. Fundamentally, the diffusion model focuses on the change of adopter quantity for innovative behavior and is concerned with the development of technological innovation. Technology is defined as systematic knowledge to create products, improve processes or provide services. When a firm is engaged in activities of technological innovation, it will be affected by the strategic factors of R&D, manufacturing and marketing. (Schoeffler et al., 1974; Buzzell, Gale & Sultan, 1975; Cooper, 1984a) and will differ from their innovation ability and external environment on innovation performance. With the coming of modern technology, many invisible assets (i.e. R&D and innovation) are becoming competitive advantages of firms, especially in PMI. Drucker (1974) indicates that innovation is not only technological, but also related to the economy or society. Therefore, the generalizations of innovation are classified into "technological innovation" and "non-technological innovation". "Technological innovation" innovates or improves a product or process; "non- technological innovation" manages technological innovation, breakthrough concepts and changes of an organization system, etc.

Afuah (1998) defines technological innovation as the improvement of a product, service, process or a new discovery. Thus, this study concludes that innovation means using new technology or knowledge of the market, to provide the customer with a new product or service, and includes invention and commercialization. However, technological innovation is the use of low-cost to improve an old product's attributes. It will create a product that has never been in the market, and this creative ability must rely on entrepreneurial ability and talent, and the degree of change on technology. Betz (1993) indicates that technological innovation is a part of innovation. He believes it is possible that technological innovation can occur at any of the processes of a production system, including: (1) renewal or improvement of the process of production; (2) renewal or improvement of the equipment of production; (3) renewal or improvement of the method and measure for manufacturing arrangement; (4) renewal or improvement of tools and software for the information integration of design and manufacture. According to the OECD's research report of the National Innovation System (1997a), knowledge technology diffuses to firms in the public and private sectors whose activities and interactions are through personnel, with this being the important judgment standard to measure the degree of technological innovation of a nation.

The process of technological innovation has some characteristics which will affect the success of innovation and diffusion directly. Dosi (1982) thinks that innovation has five characteristics: (1) uncertainty in the process of innovation, (2) complexity in the process of innovation, (3) a reliance on university research, (4) the importance of learn and do at same time, and (5) the accumulation of innovation activities. Among all the above characteristics in technological innovation, uncertainty is the most important factor. Uncertainty causes a problem in the process of technological innovation directly, and this study is concerned about the solution. The main causes of uncertainty are: (1) financial uncertainty, (2) technical uncertainty, which may be through lack of experience or a difficulty to breakthrough technology, (3) societal uncertainty, which may be policy transition, price or needs that cannot be evaluated in the market (Wejnert, 2002). Due in part to the uncertainty and difficulty of the innovation process, it needs to be overcome by knowledge learning. There



are different kinds of problems that come from technological innovation, for instance, knowledge and technology from product innovation, as regards to the situation of adoption on the evaluating market. The sources of knowledge include interchangeable technology between the manufacturers, interaction between academic and research organizations and so on; with manufacturers clustered together for the reduced transactional cost of knowledge acquirement.

The Influencing Factor of Technology Diffusion

By the diffusion of technology, enterprisers who enter later could bring technology introduction, thus accelerating the ability of self-technology construction. Galor and Weil (2000) thinks technology introduction may be more than one sided, taking some general manners; for example, purchasing through negotiations on techniques market, technology transfer from schools and research institutions or national laboratories, engaging the services of technical talent, and alliance investment with advanced manufacturers, etc. The influencing factor of technology diffusion is always the focus of scholars, integrating influence technology diffusion factor proposals from scholars, including industrial characteristics, technical characteristics and enterprise characteristics.

Industrial Features

The PMI plays an important role behind industrial upgrading, and it has a close relationship with other industries. Many machinery facilities and related technologies of downstream application industries are thus closely connected and inseparable. Therefore, application industries' downstream request for produce technology, products' precision and even the yield rate of the production line will become the motivating power for the products' improvement upstream. This study aims to focus on two characteristics, the supply chain and product quality.

Technical Features

Generally, the impression on the technical level of SMEs is low, narrow for product lines and faces external competition because of insufficient technology, talent and R&D funds due to their difficulty in investing in R&D and improving technical standards (Chinese Management Association, 1994). SMEs create economic miracles all over the world, while the SMEs' technology diffusion plays an important role between them. Integrated scholars bring influence to the factor of technology diffusion through technical maturity, technical complexity, technical type, and technical obtaining cost.

Manufacturer Features

The development of SMEs involves manufacturer's R&D. Studies of the National Innovation System (OECD, 1997a) show that technology information diffuses to public and private sectors or personnel mobility and is the most important decision of a national technological innovation. This study aims at three characteristics: company scales, R&D density, R&D mobility and manufacturer technological ability. Table 1 shows the influential factors of technology diffusion.

Factors	Sub-factors	Descriptions		
Industrial Feature	Supply chain	Industrial cluster forms a close industrial structure (ex. satellite systems), causing PMI supply chain to be complete from upstream to downstream and can make technology diffuse to neighborhood manufacturers quickly.		
	Product quality	PMI's life cycle is longer than the other industries as its precision is also in urgent demand; therefore, good technology diffusion will contribute to product quality promoting.		
	Technical maturity	SMEs are not always innovators, the key success competitors in clusters are decided by following the innovator quickly. This innovator may be a domestic or foreign manufacturer, and is the main factor allowing that new technology can diffuse in the industrial cluster quickly.		
Technical Feature	Technical complexity	Due to numerous SMEs, and that their company scales n generally big, their products are always at a lower technic standard and lower processing level. Lower technical barrie will contribute to technology diffusion.		
	The obtain cost of technology	Foundation is an essential factor that can decide whether new technology diffuses to the industrial cluster, including the purchasing of machines, collecting the cost of technology, and the patent-right royalty of technology.		
	Company scales	When manufacturers enlarge gradually, they have a stronger motivation and ability to proceed into new technology's innovation research, to strengthen the competitiveness of their industry and increase profit rates, bringing about technology diffusion.		
Manufact urer Feature	R&D density	Manufacturers only proceed into complex and precision technology if they have technical ability, and they still rely on cluster forces to bring manufacturers' technical talent and to apply and promote in neighborhood or foreign regions by technology diffusion.		
	R&D mobility	Manufacturers use new technology in production or management, make production proceeding successfully, or ensure quality personnel training can remain, or change plant, even building plant themselves so that the technology that attaches on laborer can diffuse.		

Table 1: The influential factors	s of technolog	y diffusion
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Research Methodology

A mathematical model was used in this study to explore DOI, mostly by adopting Bass's (1969) Model. The Bass Model describes the process of how new technologies get adopted as an influence between users and potential users, as among all the users are innovators and imitators. Such users can reflect on the potential market and its maximum total sales revenue of all suppliers of a product in a market during a certain period. This model is widely used in forecasting, especially for technology and product forecasting. Bass (1994) describes two forces that would be positively influenced by the previous adopters, namely the innovator and imitator. The first force is represented by the coefficient of innovation p, and the second force by q as the coefficient of imitation in this study. Mansfield (1961) claims that new technology diffusion is affected by word-of-mouth, which has three characteristics: the industrial feature, technical feature and manufacturer feature. Figure 1 shows the research framework in this study.





Figure 1: Research framework in this study

This study addresses four assumptions based on Bass's model. (1) A forecast product is a new product that adopts new technology or process, and this new product is produced from the innovative activity of a new state; (2) Every consumer purchases a unit commodity and not a redundant purchase. Among the consumers are innovators and imitators, where the innovator has independent judgment and is not affected by others, they purchase themselves. The imitator is affected by social pressure or mass media as adoption time goes by, which prompts them to purchase; (3) The market potential consumer is fixed, and will purchase a product finally; and (4) The coefficient of innovation and coefficient of imitation are fixed.

This study only considers two factors that affect the technology diffusion, which are the innovator and imitator. Thus, this study builds the Bass Model based on Bass's original paper in 1969, building the formulation as follows: if f(t) is the density function which describes the time of adoption of a population, and F(t) is the cumulative function. From the literature review, this study depicts that the hazard function describing the conditional probability at time t (or proportion of those not yet adopting) is proposed as Equation 1 and Equation 2:

$$\frac{f(t)}{1 - F(t)} = p + qF(t) \qquad (1) \qquad \frac{dF}{dt} = p + (q - p)F - qF^2 \qquad (2)$$

Assuming F(0) = 0, the solution to the differential equation in Equation 2 is given by:

$$F(t) = \frac{1 - e^{-(p+q)t}}{1 + (\frac{q}{p})e^{-(p+q)t}}$$
(3)

Then, the density function becomes:

$$f(t) = \frac{\frac{(p+q)^2}{p}e^{-(p+q)t}}{(1+(\frac{q}{p})e^{-(p+q)t})^2}$$
(4)

The total number of ultimate adopters (the market potential) is given by m, and assumes each adopter only adopt one unit. The sales volume of t times can use S(t) = mf(t) to transform into the form of destiny function, where f(t) is given by Equation 4. This is the Bass Model in the time domain, and if the cumulative adoption domains where Y(t) = mF(t), it can be written as Equations 5 and 6:

$$S(t) = pm + (q-p)Y(t) - (\frac{q}{m})[Y(t)]^{2} (5) \qquad Y(t) = m \left| \frac{1 - e^{-(p+q)t}}{1 + [\frac{q}{p}]e^{-(p+q)t}} \right|$$
(6)

where

S(t) = The predicted number of customers who have already adopted the innovation in period t;

Y(t) = The cumulative of the previous number of customers in the adopting target segment at time t;

p = The innovation coefficient of technology diffusion;

q = The imitation coefficient of technology diffusion;

m = The number of basic potential adopters of PMIs in the central Taiwan area.

In Equation 5, this study defines Y(t) as the cumulative number of adopters before time t in the market. This study uses mathematics to express $\sum_{x=1}^{t-1} Adp_x$, and the right side of the

equation is composed from two parts:

p[m-Y(t)], meaning the number of manufacturers who adopt technology diffusion from the initiative, which is affected by external influence.

 $\frac{q}{m}Y(t)[m-Y(t)]$, meaning the number of manufacturers who adopt technology diffusion from

the other buyers, which is internal influence.

On the right side of the above equation m-Y(t) means the number not adopted yet in the period time t. The growth rate of the innovative adopter will decrease gradually; however, the growth rate of the imitator adopter decreases after increasing. The cumulative number of the adopter curve shows as an S-curve generally. To estimate the coefficient of innovation and imitation is decided by a manager subjectively, or estimated using analogy diffusion. This study adopts the latter option. Owing to the early development of DOI, it has had twenty to thirty histories already. The variable that affects demand and consumer originally behavior extends gradually, the diffusion model that is considered variable has been used quite extensively. Industrial clusters that affect the influencing factor of technology diffusion include industrial features, technical features, and manufacturer features. The Bass Model related application literature uses actual data from the past; it does not know the actual parameters and reliable comparative values in the PMI.

The innovation coefficient p and imitate coefficient q in the Bass Model has quite an effect in each new technology development stage. Bass (1994) describes two forces which would be positively influenced by the previous adopters, which are the innovator and imitator. The first adopter is represented by the coefficient of innovation p and the second adopter by q as the coefficient of imitation. When time t=0, the adopted rate of new technology and the magnitude of its reactive innovator has the degree of importance influence within the social system (Bass, 1969). Sultan, Farley and Lehmann (1990; 1996) analyze the parameters, and generate estimates from a study of 213 actual product and Bass Model's extensions. Their report indicates that the average value of p is 0.03, and the average of q is 0.38. Dolan & Jeuland (1981) finds that the value of p is often quite small, generally 0.01 or less, but q is rarely greater than 0.5 or rather less than 0.3.

Scholars reveal through their research of the Bass Model that in the short time a new product enters the market, the innovator is an important factor that starts diffusion of the new product in the market. Through the innovator, new products gain a significant market share in the sector. It can accelerate diffusion of new products in the market (Robinson & Lakhani, 1975). Therefore, according to related literature (Krishnan *et al.* 1999) this study adopts a simulating analysis to set the variation value of parameters as shown in Table 2.

Parameter	Variation Value					
p+q	0.05	0.24	0.42	0.86	1.00	
q/p	0.75	1	10	20	40	

 Table 2: Variation value of parameters

Due to the parameter being without a precise value, this study assumes the pair value of p+q and q/p. It is convenient to the numerical design without assuming p p and q directly. These two parameters are suitable to accumulate the number Y(t) in the Equation 6, which is a variation relation in the different units of time (Figure 2). From Figure 2 (a), when



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p+q=0.42 and q/p=10, that is t=5 units of time, the curve of the accumulated number emerges at the concave point, the number gliding in the twinkling of an eye. However, the limit value p+q=1 means all potential adopters will adopt this technological innovation in the estimated period, and may happen into technology diffusion in the period of the technology's life cycle.



Figure 2: Relationship between Y(t) *and* p+q

From Figure 2 (b), both p+q=0.86 and p+q=1, and the concave point develop gradually. From Figures 2 (c)~(d), this study found that p+q=0.05 and q/p=0.75, the unit time is t=5~60 and its accumulated number is changeable and huge. However, p+q=0.24, 0.42, 0.86 and the limit value p+q=1, so there the curve of the accumulate numbers show gradually, and the ranges vary only marginally. The detailed data is found in Table 3.

p+q	q/p	<i>Y</i> (5)	<i>Y</i> (10)	Y(20)	Y(30)	Y(40)	<i>Y</i> (50)	Y(60)
0.05	0.75	10916.83	21143.36	38732.51	52028.79	61370.31	67699.83	71613.57
0.24	1	41986.54	65175.12	76903.7	78063.35	78168.41	78179.04	78179.91
0.42	10	30840.36	66965.75	77987.05	78177.1	78179.96	78180	78180
0.86	20	60658.30	77878.85	78179.94	78180	78180	78180	78180
1	40	61167.49	78034.74	78179.99	78180	78180	78180	78180

Table 3: Data of Y(t) *and* p+q

When technology innovation diffuses in industrial clusters, potential adopters including both innovator and imitator grow with increased time (Bass, 1969; 2004). This study adopts a Bass Model which builds up from Bass's original paper (1969), and is aimed at the relationship between innovator and imitator, and concreted feasibility. These can estimate tendency and forecast technology diffusion further.

Research Analysis and Result

Technology diffusion happens behind the technology progress and technological innovation. Technological innovation relates to the spread process in the market and decides whether manufacturers adopt a technological innovation, which may be concerned with mass media or word-of-mouth processes. According to the literature review, innovator means adopting through mass media or leads into commercial activity; however, imitators spread from the technology diffusion externally.

The DOI theory can be used to develop a technology life cycle, and the Bass Model provides forecast adopters of the new product. This study shows simulating analysis results by using the Matlab R2009a program, to know the unit time point of technology diffusion by chart. This study sets the initial data of innovation coefficient p value as 0.03, and the imitation coefficient q value as 0.38. The accumulative total is 0.001 each time, so the initial number of people of potential market m value is 78,180, and this is the source data from a PMI's employee in central Taiwan in 1997. Based on this source data, this study predicts potential adopters will grow by 3% every unit of time shown in Table 4. As a result of the Bass Model, this will cause the graph to depict by the difference of the group, and the amount of the group will influence the graph. This study uses different groups to estimate the main of the foundation DOI graph, which fits the original Bass Model. This part separates from two operation equations to discuss the Bass Model. One is technological innovation that has already been adopted, accumulative adopters Y(t), the other one is the number of adopters S(t), with the latter S(t) according to the result of the Y(t) equation. These two operation equations were compared, to analyze and discuss technology diffusion in different unit time.

The amount of accumulative adopters Y(t)

Y(t) means technological innovation through mass media and word-of-mouth in the market, derives technology diffusion eventually, and it is already accumulative adopters in the unit time of t. The difference groups of data shown as Table 4, substituted this data into Equation 7 and a modeling analysis was carried out with the Matlab program, setting the value conveniently, and calculating p+q and q/p from the assumed value of p and q in Table 4.

$$Y(t) = m \left[\frac{1 - e^{-(p+q)t}}{1 + [\frac{q}{p}]e^{-(p+q)t}} \right]$$
(7)

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Ite	Innovation	Imitation coefficient	Market potential		
	antiovation		(m)	p+q	q / p
m	coefficient (p)	(q)	(111)		
1	0.03	0.38	78,180	0.41	12.667
2	0.031	0.381	80,525	0.412	12.290
3	0.032	0.382	82,941	0.414	11.938
4	0.033	0.383	85,429	0.416	11.606
5	0.034	0.384	87,992	0.418	11.294
6	0.035	0.385	90,632	0.42	11
7	0.036	0.386	93,351	0.422	10.722
8	0.037	0.387	96,152	0.424	10.459
9	0.038	0.388	99,036	0.426	10.211
10	0.039	0.389	102,007	0.428	9.974

From Figure 3, the Bass Model depicts an already accumulative adopters curve Y(t). The amount of accumulative adopters increases with the increase of unit time. When modeling data reach to modeling data of 60 groups', the curve become stable, this study finds the whole PMI adopting technological innovation needs no more than 60 unit time. These cumulative numbers of adopters Y(t) are similar to the S-curve, and its apparent inflection point at 10 unit time approximately, reveals a technology diffusion curve similar to the S-curve.

Betz (1993) addresses technology markets, and that technology developments need a quantifier of time before technology enters the market. The technology life cycle goes through technological processing, technological innovation, and then technology diffusion. From Figure 3 (a)~(d), it needs 10 unit times approximately to a wide changeable range of cumulative number of adopters, technological innovation can be convinced and satisfies adopters' expected impressions when a technology enters the market. After about 10 unit time, the range of the cumulative number of adopters' needs are close to technology diffusion. For satisfaction of a firm's long term development, adopters will take action when technological innovation is valued for the adopter. To broaden the scope, a unit of estimated adoption reaches 80 and 100 unit times, like Figure 3 (g)~(h), while the curve is also similar to 50 and 60 units of time (Figure 3 (e)~(f)).







Figure 3: Bass Model plot Y(t) modeling data of 10, 20, 30, 40, 50, 60, 80 and 100 The PMI industrial cluster is formed with SMEs, which has a highly degree of specialization in cluster. From the cumulative number of adopters Y(t) between firms, its relationship can be separated into innovative cumulative adopters and imitate cumulative adopters, with its equations as Equation 8 and Equation 9.

$$Y_{innovator}(t) = m \frac{p}{q} \ln \left[\frac{1 + \frac{q}{p}}{1 + \frac{q}{p} e^{-(p+q)t}} \right]$$
(8)
$$Y_{imitator}(t) = Y(t) - Y_{innovator}(t)$$
(9)

The innovator strides across time and adopter type in the process of technology diffusion, due to the number of innovator less than the number of imitator in general. By substituting data from Table 4 into Equations 8 and 9, this study gets Figure 4, among the figure, the light color curve is imitate cumulative adopters, and the deep color curve is innovate cumulative adopters. In the beginning, innovate cumulative adopters are more than imitate cumulative adopters. Imitator increases twofold at the 4 unit time (data as in Table 5), and exceeds in the number of innovators. Total cumulative adopters are the sum of innovate cumulative adopters and imitate cumulative adopters. If compared with these three cumulative adopters curves, this study finds that the change of total cumulative adopters is similar to imitate cumulative adopters, like Figure 5, where the topmost curve is the total cumulative adopters.



Figure 4: Bass Model plot innovate and imitate cumulative adopters



Figure 5: Bass Model compared to innovator and imitator with total cumulative adopters



t	Innovate cumulative	Imitate cumulative	Total cumulative
ι	adopters(unit: people)	adopters(unit: people)	adopters(unit: people)
1	2,306	490	2,796
2	4,797	2,276	7,072
3	7,419	5,844	13,263
4	10,097	11,558	21,655
5	12,738	19,432	32,170
6	15,250	28,960	44,211
7	17,565	39,194	56,759
8	19,648	49,084	68,732
9	21,507	57,864	79,371
10	23,177	65,214	88,391

Table 5: Innovators and imitators cumulative adopters

In the industry of PMIs, the demarcation line of innovator and imitator is blurred, so this study defines adopters as external influences and internal influences, which is clear to make the differentiation. Generally speaking, the manufacturers who have technological innovation ability are willing to lead production. Large-scale manufacturers in PMI are always regarded as innovative leaders; however, many small-scale manufacturers are imitators. The small-scale manufacturers adopt technological innovation according to technical maturity, technical complexity and the obtain cost of technology from large-scale manufacturers.

This study observes innovator and imitator and the difference in the increase number of cumulative adopters from last unit time to this unit time. As Figure 6 shows, x-axis is the unit time, and y-axis is the increased number of adopters. This study finds that imitate cumulative adopters are changeable is quite obvious, and it is a significant difference at the beginning of imitation with the variable number growing like a steep slope, and peaking at about 6 unit time. Otherwise, the changeable number of innovators is smooth comparatively. If compared such innovator as a R&D role in a PMI and the imitator is play a role of sales, then the innovator's R&D technology knowledge is penetrative and not limited by other opinions. Sales of SMEs need a foundation on past technology as there imitative samples and creates innovative products to try their best.



Figure 6: Increased numbers of innovate and imitate cumulative adopters

According to the assumption, the potential adopter is a fixed value, and adopts technological innovation eventually. When fixing the innovation coefficient and imitation coefficient as a group parameter, the potential adopters (*m* value) do not grow with time and fix the *m* value at 78,180 and 447,190, which is group data of 1 unit time and 60 units time. The more potential adopters, the cumulative number of adopters Y(t) need the most time to reach their peak. In Figure 7, when m=447,190, the peak time is about 15 units time;



however, with m=78,180 only about 10 units of time result. In constant, the cumulative adopters curve shows a steep slope at the initial stage, whether the number of adopter is increase violent or not (as Figure 7). If the innovation coefficient of the p value's initial data is 0.03, add 0.001 to each unit time; if the imitation coefficient q value starts at 0.38 starting, also add 0.001 to each unit time. The potential adopters (m value) are 78,180, and assuming a PMI employee decline of 3% with each unit time its curve is as seen in Figure 8. The cumulative adopters of one-fifth of the former unit time are like Figure 7, with the curve growing as rapidly as a slope. It reveals that in the initial stage of employee decline, it will not influence the cumulative number of adopters; while when the new technology launches into market, the cumulative number of adopters decreases as it slides with the decline of potential adopters (m value).



Figure 7: Bass Model plot Y(t) when m value is fixed at 78,180 and 447,190



Figure 8: Bass Model plot Y(t) when m value slowdown

The amount of adopters S(t)

The number of adopters are different to cumulative adopters, with the formula S(t) as Equation 10, it is according to the results of cumulative adopters Y(t), substitute Y(t) into S(t)to derive the Bass Model. The parameter setting is similar to the number of cumulative adopters Y(t), where the innovation coefficient p value's initial data is 0.03, and 0.001 is added to each unit time. The imitation coefficient q value is 0.38 starting, and also 0.001 is added to each unit time, and the potential adopters (m value) are growing through the changeability of PMI employees. Figure 9 is the number of adopters, its modeling unit time is 10, 20, 30, 40, 50, 60 groups data.





Figure 9: Bass Model plot S(t) with 10, 20, 30, 40, 50, 60 group data

Modeling 60 groups of data, this study finds that the curve smoothes gradually at onethird of the whole unit time, and after that the number of adopters tends to zero (Figure 9). The study suits this group data with DOI theory, so this study consider that the front of the sixth group innovators and early adopters. The latter groups are early majority, late majority and laggard, which tend to zero. The innovator increases rapidly at the beginning of the curve, meaning that the technological innovation will be available to all adopters; however, the amount of technology diffusion adopters will decrease and tend to zero, that is to say, the degree of diffusion is slow and smooth after technological innovation. Supposing the m value is simulated as growing, fixed and declining, the curve of adopters number S(t) as in Figure 10. The number of adopters in clusters will grow, remain fixed or decline with potential adopters, while it can be seen that the three curves are nearly overlapping in Figure 10, with only the peak number of adopters different (detail data as Table 6). However, the cumulative number of adopters Y(t) gradually glides with a 3% decline of the potential adopters in each unit of time. By contrast, the adopters curve S(t) almost overlaps, this study finds that no matter how potential adopters vary to increase or decrease, as well as innovator and imitator, its curve is smooth in which the curve S(t) almost overlaps.

The curve Y(t) and S(t) has close relations, due to Y(t) being the cumulative number of adopters, and S(t) depicting the number of adopters. For the reason why S(t) variations are not as strong as Y(t), the *m* value declines with 60 group data of Y(t) and S(t) in Figure 9. In Figure 10, one sixth of a front curve is dramatized, after that, the Y(t) is gliding smooth but the S(t) declines in a short time. With these two curves, this study has mutual proof. The industrial cluster plays an important role in central Taiwan, especially for PMIs, as its supply chain is complete from upstream to downstream, which has produced an economic miracle over the past three decades. For the strong development of PMI, innovators and imitators are all potential adopters, with the innovator leading imitator into creating more economic miracles.



Figure 10: Plot of the S(t) with m value growth, fixed and slowdown



Item	m value growth	m value fixed	m value slowdown
1	3286	3286	3286
2	4735	4597	4459
3	6486	6114	5752
4	8296	7592	6929
5	9735	8649	7657
6	10343	8922	7662
7	9905	8296	6910
8	8600	6992	5650
9	6862	5417	4246
10	5121	3925	2984

Table 6: S(t) Data results with m value growth, fixed and slowdown

Innovation coefficient p greater than imitation coefficient q

The main subject of this section is to explore the innovation coefficient p greater than imitation coefficient q, in other words, the influence of internal technology diffusion is greater than external technology diffusion. In general, industrial clusters and technology diffusion being in a relationship helps each other forward. The influence factor of internal and external technology diffusion can subdivide into three important characteristic.

In PMI industrial clusters, when SMEs adopt new technology until technology diffusion happens, it will be easily affected by industrial features, technical features and manufacturer features. Facing the new technology, managers and decision makers not only need to understand the technological content, but also consider the leading time to enter the market. Basically, the earlier they enter the market the more benefit they can obtain, but they take the risk of failure or mistake. However, laggards may avoid the risk of immature new technology, and therefore they could influence the diffusion of technological innovation themselves. As in the findings of section 4.1, the number of technological innovation adopters in the initial stage reveals a curve that increases like a steep slope, and in later stages become gradually slower with time, thereafter.

This study set the innovation coefficient p at 0.2~0.259, and the imitation coefficient q at 0.03~0.089. The innovation coefficient is greater than the imitation coefficient at this time, and it shows the curve of adopter number S(t) as seen in Figure 11. If simulating the adopter m value growing, fixed and declining with time, the curve varies as seen in Figure 12, where the upper line represents potential adopter growth at 3% every unit time (as Figure 11), the middle line represents potential adopter as fixed, and the lower line represents potential adopter decline at 3% every unit time. The variations of curve are similar to each other, and almost overlap, revealing that the influence of the whole adopter number is small comparatively when the innovation coefficient is greater than the imitation coefficient.

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Figure 11: Bass Model plot S(t) when p=0.2~0.259, q=0.03~0.089



Figure 12: m value variations (growing, fixed and decline) when p=0.2~0.259, q=0.03~0.089

This study fixed a group of innovation coefficients p as $0.2 \sim 0.259$, and varied the imitation coefficient q to three group of data: $0.03 \sim 0.089$, $0.09 \sim 0.149$ and $0.15 \sim 0.209$. The curve of adopter number S(t) is shown in Figure 13, and this study finds that the larger of the imitation coefficients has more adopters at the initial stage. Also, by comparing the three groups of data, the curve overlaps at the 6 unit time, it appears as a turning point (detail adopter number as Table 7). This result reveals that when the scope of innovation coefficient p is $0.2 \sim 0.259$, the curve is a significant variation at the front of one three. The diffusion process of technological innovation reflects the amount of firms adopting technological innovation as time and environmental variations. When a technological innovation emerges in an industrial cluster, it does not matter if it is a new product, new equipment, new material or new technology combination, if they can lead in adopting by a cluster member and benefit by making profit, it has the opportunity to diffuse. This study fixed a group of innovation coefficients and varied three groups of imitation coefficients, and in the comparison of the innovation coefficient to innovator in industrial cluster, the imitation coefficient is decided to imitate from external influence. Innovators face an uncertain market need when a technological innovation is emerging in the short-term. The innovation adopter may be a potential adopter for innovative technology. Therefore, they estimate the cost of deriving the new technology, and if the technology development suits the enterprise, they can invest capital and move quickly into production; however, imitator imitate by drive benefit of firms in industrial cluster. At this time, the degree of following imitation is different, that is different from external influence, so this variation will speed the diffusion of technological innovation, prompting more and more potential adopters to adopt.

Item	q=0.03~0.089	q=0.09~0.149	q=0.15~0.209
1	13116.98	13766.90	14443.04
2	11266.99	12143.30	13051.02
3	9579.16	10400.23	11203.16
4	8066.64	8679.99	9199.08
5	6732.83	7084.83	7279.25
6	5573.44	5674.53	5590.37
7	4578.57	4473.16	4192.63
8	3734.68	3479.24	3086.21
9	3026.25	2675.79	2238.63
10	2437.08	2038.23	1604.97

Table 7: Three groups of imitation coefficient q variations of S(t) when $p=0.2\sim0.259$



Changes in the imitation coefficient q as 0.03~0.089, vary the innovation coefficient to three groups of data: 0.2~0.259, 0.3~0.359 and 0.4~0.459. The curve of the adopter number S(t) is as seen in Figure 14, which is different in approach but equally satisfactory in result with Figure 13 which is a fixed innovation coefficient. The larger of the innovation coefficients, it has more adopters at the initial stage. To compare the three groups of data, the curve overlap at the 3 unit time appears at the turning point (detail adopter number as per Table 8). This result reveals that when the imitation coefficient scope is 0.03~0.089, the curve is also a significant variation at the front of one three. The overlap time advances by almost 3 unit time, meaning the variation of innovation coefficient will have a larger influence on the diffusion of technological innovation.



Figure 13: Bass Model plot S(t) when p=0.2~0.259, q=0.03~0.089(upper line), q=0.09~0.149(middle line), q=0.15~0.209(lower line)



Figure 14: Bass Model plot S(t) when q=0.03~0.089, p=0.2~0.259 (upper line), p=0.3~0.359(middle line), p=0.4~0.459(lower line)

Table 8: Three groups of p value variations of S(t) when $q=0.03\sim0.089$

Item	p=0.2~0.259	p=0.3~0.359	p=0.4~0.459	p=0.5~0.559
1	13116.98	17757.54	21372.26	24118.77
2	11266.99	13689.87	14814.12	15047.99
3	9579.16	10421.81	10126.68	9253.88
4	8066.64	7849.17	6847.31	5631.05
5	6732.83	5857.39	4589.48	3399.05
6	5573.44	4336.25	3053.90	2038.49
7	4578.57	3187.66	2019.51	1215.81
8	3734.68	2328.64	1328.17	721.57
9	3026.25	1691.43	869.13	426.30
10	2437.08	1222.12	566.09	250.76

This study adds the fourth group of data into variation of innovation coefficient, and sets the data as imitation, which makes the innovation coefficient scope $0.03 \sim 0.089$. The investigation has found that the curve is also a significant variation at the front of one three. With the variation of innovation coefficient becoming gradually larger, the range of variation shown on the curve becomes smaller. When the innovation coefficient scope is $0.5 \sim 0.559$ (the 4th line in Figure 15), the adopters of the curve tend to 0 with time, and display negative values finally. The adopters show minus values, and although they offer no benefit to the diffusion of technological innovation, they do reveal that this group of innovation coefficients may not fit with the Bass Model.



The innovative activities of SMEs of industrial clusters will help firms to increase their aptitude in technological innovation. The PMI industrial cluster in the central Taiwan area relies on its geographical advantage, as it has satellite factories to support production in cluster, and the cluster manufacturers are mutual suppliers. Their scale is generally not large, which firms can adapt to technological innovation based on their ability and condition. Suppliers from upstream to downstream decide the degree of improvement, and whether to simplify or to innovate their technology depending on the market need. However, if they lack

simplify or to innovate their technology depending on the market need. However, if they lack innovation, they may be eliminated through competition. To promote aptitude and compatibility in firms, they will have to accelerate the diffusion of technological innovation in the industrial cluster.



Figure 15: Bass Model plot S(t) when $q=0.03\sim0.089$, $p=0.2\sim0.259$ (1st line), $p=0.3\sim0.359$ (2nd line), $p=0.4\sim0.459$ (3th line), $p=0.5\sim0.559$ (4th line)

Innovation coefficient p smaller than imitation coefficient q

The main subject of this section is to explore the innovation coefficient where p is smaller than imitation coefficient q, or in other words, when the influence of internal technology diffusion is smaller than external technology diffusion. The technological innovation and diffusion in industrial clusters is especially important for external environmental factors. This study set the innovation coefficient p at 0.03~0.089 and the imitation coefficient q at $0.2 \sim 0.259$, which exchanges two of the coefficients. At this time, if the innovation coefficient is smaller than the imitation coefficient, its adopter number curve S(t) is as seen in Figure 17. If simulating the potential adopter (*m* value) growing, fixed and declining with time, its curve varies as per Figure 17, where the upper line represents the potential adopter growing 3% every unit time (as Figure 16), the middle line represents the potential adopter fixed, and the lower line represents potential adopter decline at 3% every unit time. The curve varies based on time and the number of adopters increasing at its peak, with the curve growing as a steep slope before reaching the peak; also the curve is few and scattered between each data. The curve decreases after its peak, and each data path becomes closer together. Simulating the number of adopters, the curve varies when adopters are growing, fixed and declining, having similar variations.





Figure 16: Bass Model plot S(t) when p=0.03~0.089, q=0.2~0.259



Figure 17: m value variations (growing, fixed and decline) when $p=0.03\sim0.089$, $q=0.2\sim0.259$

From this study setting, the potential adopters will grow 3% with every unit time. Fixing the innovation coefficient at $0.03 \sim 0.089$ varies the imitation coefficient to three groups of data: $0.2 \sim 0.259$, $0.26 \sim 0.319$ and $0.32 \sim 0.379$. The curve of adopter number S(t) is as Figure 18. This study finds that when the innovation coefficient p is smaller than the imitation coefficient q, when the innovation coefficient p is fixed, making the scope of imitation coefficient q as $0.2 \sim 0.379$ and the curve varying significantly on the half of the curve ahead. To compare three groups of data, the maximum adopters all almost appear before one sixth of the curve (detail adopter number as Table 9), being approximately at the 7 unit time. The curve in Figure 17 is comparatively few and scattered, it reveal that not only affect the adopters of peak, but influence on the diffusion rate of technological innovation. Through simulating analysis, this study finds that these three groups of data are different from the unit time of the maximum adopters.



Figure 18: Bass Model plot S(t) when p=0.03~0.089, q=0.2~0.259, q=0.26~0.319, q=0.32~0.379

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Item	<i>q</i> =0.2~0.259	<i>q</i> =0.26~0.319	<i>q</i> =0.32~0.379
1	2762.42	2927.16	3101.47
2	3410.76	3807.99	4248.08
3	4126.74	4813.78	5597.53
4	4871.73	5869.10	7011.40
5	5586.91	6849.35	8248.96
6	6198.48	7599.12	9024.73
7	6630.51	7975.91	9129.44
8	6822.83	7902.80	8540.50
9	6747.78	7400.02	7431.50
10	6418.23	6574.58	6074.28

Table 9: Three groups of q value variations of S(t) when $p=0.03\sim0.089$

The technological innovation from the firm's innovative activities has benefit for the breakthrough technological innovation of the industrial cluster. It makes internal influence greater than external influence, which will shorten the unit timer of the adopted technological innovation in the industrial cluster, and also has the advantage of diffusing technological innovation. By contrast, the technological innovation effect from external influences needs more time to deplete and allow coordination. It has the ability to convert into experience inside the business, and as a result, stretch the unit time of adopting technological innovation. In order to weed through the old to bring forth the new technology innovations, before a manufacturer decides to adopt an innovative technology they always estimate the investment of innovative technology, to understand clearly the adoption situation of new technology in the market. Over a long period of time, the PMI in the central Taiwan areas has developed high accuracy and R&D technology. It is always used to manufacture every kind of component of machinery, and is located in the core location of Taiwan's machinery industry. For this reason, it relies on innovative activities to enhance the R&D ability of innovative technology.

Conclusion and Recommendation

This study applies the Bass Model to simulate the variation of technological innovation and explore technology diffusion in industrial clusters. The policy decision by a manager of a firm must consider the most important problem, which is the time it takes for a technological innovation to enter the market successfully. Early adoption of new technology gives priority to the acquisition of benefits; it must run the risk of failure or mistakes. However, late adopters could avoid the risk by imitating technology. This study applies the DOI theory, builds a Bass Model grounded in Bass's original paper (1969), and discusses a new technology from technological innovation to technology diffusion.

Exploring the relationship between innovator and imitator, a new technology adopts at a specific unit time in the market. The potential adopters include both innovator and imitator, and while the innovator is not affected by adopters, the importance of the innovator is maximum in the initial unit time, and as time goes by, their significance decreases gradually. However, as the imitator is affected by the word-of-mouth adopters because of community pressure, there are more and more forerunners driving the imitator to follow and adopt. The cluster of SMEs has advantages to interchange information of technological innovation through the process of diffusion. Furthermore, geographical space neighbors, close cooperation relationships and frequent information interchanges raise the firm's cognitive ability for technological innovation, with firms not needing to experiment personally. By only



taking messages in the interchange and observing cluster member, they can apply the process and result for technological innovation, predict the cost, risk and benefits of adopting some technological innovation, and then make an adopting choice. This study separate conclusion according to the size of innovation coefficient and imitation coefficient as following:

Innovation coefficient *p* greater than imitation coefficient *q*

When the innovation coefficient p is greater than the imitation coefficient q, the variation of innovation coefficient has a greater and quicker effect on the whole adopters. The innovative activity of SMEs offers the benefit of enhancing the aptitude of technological innovation in the industrial cluster. A new technology has high costs at the initial development stage, but the cost of imitation is almost zero. The innovators have a high aspiration to adoption, and the value will increase until technological innovation adopters reach their peak, and then reduce with time and be replaced by imitators. However, more and more potential adopters may not bring advantages to industrial cluster. With the environment changeable, the firms hold the order until the last minute, while although convenient and quick communication can increase the number of orders, the exchange experience of innovator and imitator also promotes good commercial potential. They don't need to reduce stock radically from the bad environment of the whole supply chain anymore.

PMIs belong to the industrial cluster in central Taiwanese areas, it scale is small and precise generally, and as PMI specialize in components or producing modules, the manufacturers rely on each other's production alliance and share technology in the supply chain. Owing to the high development cost, if manufacturers can specialize in their professional skill and reduce imitation costs, it can promote their production grade further. It's difficult to perceive the contrast between innovators and imitators. The innovators adopters that aspire and lead to innovative technology compose and produce alliances in the industrial cluster; however imitators following innovators to accelerate go through technological innovation.

By contrasting the DOI theory and real modeling of the Bass Model in Figure 19, this study adopts PMI's employees in central Taiwan as potential adopters (m value) and assumes initial data of innovation coefficient p and imitation coefficient q to do modeling. Technology diffusion is a technology which spreads naturally and has spontaneity. The DOI theory curve of technological innovation emerges in an industrial cluster. Actually, it varies at the top one-third of the curve and the number of adopters is zero afterwards. According to the geographical view point of, technology diffusion is technology floating and transferring in the environment; it is the communication channel of technology and are not affected by social pressure. Imitators adopt by following when they see the commercial potential.



Figure 19: Contrast DOI theory and Bass Model (p>q)

Innovation coefficient p smaller than imitation coefficient q



When the innovation coefficient p is smaller than the imitation coefficient q, manufacturers are affected by the external influence which is greater than the internal influence, and the variation of the curve increases to the peak then decreases gradually. When the curve increases, their technological innovation is just scattered and does not progress as a regular pattern. The early adopter rights at this stage, and their diffusion relies on the degree of technological innovation. Regarding the curve after the peak, the technological innovation also slows down, but diffusion just like word-of-mouth is extended and has high influence in the industrial cluster. Due to the development of the PMI in this decade, with the cost and price of commodities increasing, and the shorter time schedules for product development, manufacturers should consult and verify their customer's needs. Therefore, Taiwan has gradually developed complete and horizontal integration of satellite supplier systems connected with the upstream and downstream supplier chain, making it more stable to receive orders. The theory of Long Tail (Anderson, 2004) is like a diversity strategy - it stretches time with a long tail force and produces maximum accumulative quantity, which makes the product life cycle grow and product quality become more important, thus creating higher sales. In the industrial cluster of the PMI, the Long Tail effect may not be significant, but innovative forerunners see the shadow of Long Tail indistinctly. In the past, manufacturers commonly position the consumers at a high and low-level, and keep a 20/80 principle.

The PMI is different to the traditional machinery industry; they emphasize the customization and small profit market, and this is the foundation of the Long Tail theory. In the tendency of the retail sale stage, the competition environment of the homogenized manufacturer not only needs specialized technology but decreases the barrier of technology, while it can promote lower level product manufacturing and have benefit to diffuse technological innovation.



Figure 20: Modeling data of 100 groups

There is quite a difference between the DOI theory and real modeling Bass Model in Figure 21, where the peak number of the adopter is shown in different time. The DOI theory curve is smooth at the initial adopting time of technological innovation; however, the number of adopters of the real modeling Bass Model change violently at the half front of the curve. Imitation has the benefit of decreasing the promotion cost from innovators, because imitators will adopt the core-technology of innovators and imitate it, replacing the marketing and promotion of innovators.





Figure 21: Contrast DOI theory and Bass Model (p < q)

In the traditional view, people thought imitation is being a copycat. However, there are more and more SMEs in central Taiwan, especially in PMI industrial clusters, to save labor and cost, and small-scale companies have the disadvantage on component production available to all. If these companies imitate big-scale companies or even attach to the production, it can not only solve stocks, but create commercial potential in their collaborations.

Suggestion

According to the literature review, Fourt and Woodlock (1960) think the innovator is guiding the adoption of technological innovations through the mass media, but Mansfield (1961) believes that the imitator adopts through word-of-mouth. As a result, the Bass Model integrates the idea of innovator and imitator, merging Fourt and Woodlock (1960) and Mansfield (1961) into an integrated model. Since the innovators emphasize the technical features of new technology, they don't care about the cost of obtaining technology; otherwise, the imitators emphasize technical maturity and technical complexity. As a result, manufacturers should strive for a sales strategy to make imitators aware of the technical features of new technology, and let the innovator know the cost of obtaining technology. With this effort, the member pays attention to the importance of the technological innovation in the industrial cluster, thus diffusing by understanding.

The other suggestion is to see the dependence of technology in a country, which is its technology export and import. Importing new technology and diffusing will shorten the distance between innovator and imitator in productivity. Using the Bass Model to explore the tendency of technological innovation and diffusion, the limitations of the model need to be considered; for example, if the curve of technical development is not fixed and inflexible, it will vary with the new development of machinery. Facing an age of a micro-interests world, innovators are a significant feature that affect whether technological innovations will be diffused successfully. In order to enhance the competitiveness and differentiation of technological innovations, it is fundamental that innovators should create niche markets.

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Dynamic volatility spillovers across emerging CDS markets

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Abstract

This article examines the contagion effect across the nine emerging CDS markets using the multivariate DECO-GARCH model. In addition, we also identify potential structural breaks, which are associated with recent two financial crisis, such as the 2007-2009 global financial crisis (GFC) and 2009-2010 European sovereign debt crisis (ESDC). These crises necessarily increase the linkages of CDS markets. Our empirical results show strong evidence of equicorrelation in the volatility and significant dynamic spillovers across emerging CDS markets. Moreover, these volatility spillover trends are more pronounced in the aftermath of the recent financial crises, namely the GFC of 2007-2008 and the ESDC of 2009-2010. This implies that the crisis intensifies the spillovers across emerging CDS markets and diminishes the portfolio benefits in these credit markets. Thus, our finding supports the contagion effect during the market turmoils.

Keywords: Dynamic spillovers; financial crisis; multivariate DECO-GARCH; ICSS algorithm

Main Conference Topic: Financial Economics

Introduction

Sovereign credit risk arises when a government fails to meet its debt covenants or to fulfil its obligations in the form of guarantees (Pokorná, & Teplý, 2011). The 2007-2008 global financial crisis (GFC), which was triggered by the 2007 subprime mortgage crisis in the United States and spread widely to global real economics, is an example of an extreme negative risk event that led to an increase in the sovereign credit risk in the 2009-2012 European sovereign debt crisis (ESDC). Sovereign credit risk affects both risk premiums (e.g., borrowing costs) and a country's ability to access global debt markets. Understanding the co-movement of sovereign credit debt swaps (SCDS) markets, the way such changes spread and its impact on the financial stability has become of great importance for governments and their financial supervisory (Gündüz, & Kaya, 2014).

For theoretical and empirical reasons, the information transmission mechanisms across in CDS markets have drawn the attention of numerous academics and practitioners as they both play crucial roles in optimal portfolio and risk management. The phenomenon of spillover implies that one large shock increases the correlation not only in its own asset or market but also in other assets or markets as well. This effect can be particularly intensified during the GFC and ESDC, which further implies that both volatility and correlations persistently move together over time (Kenourgios, & Dimitriou, 2015). Thus, investors would have to improve the risk-adjusted returns performance of their portfolios by adjusting their asset allocation decision in order to reduce contagion risks (Hemche et al., 2016).

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This paper investigates volatility spillover effects across the nine emerging CDS markets, namely Brazil, China, Indonesia, Korea, Malaysia, Philippines, Russia, South Africa (S.Africa) and Thailand. Our study contributes to the existing literature in the following two aspects. First, we adopt the dynamic conditional equicorrelation (DECO) model of Engle and Kelly (2012) to determine the spillover effects across the emerging CDS markets. More importantly, the DECO model is essentially an extreme case of the DCC model in which the correlations are equal across all pairs but the common equicorrelation is changing over time. Second, using the iterative cumulative sum of squares (ICSS) algorithm of Inclán, & Tiao (1994), we also identify possible structural breaks, which are associated the recent financial crises (GFC and ESDC). These financial crises imply that both volatility and correlation persistently move together over time, which supports the market contagion effect. Thus, evidence of the spillover effect of sovereign CDS market has important implications for risk diversification with respect to debt portfolios and for developing regulatory tools against the likelihood of contagion.

The remainder of this study is organized as follows. Section 2 discusses the methodology used in this study. Section 3 describes the data and conducts some preliminary analysis. Section 4 reports the empirical results. Section 5 provides concluding remarks.

Econometric modeling framework

Engle, & Kelly (2012) propose the Dynamic Equicorrelation GARCH model (DECO-GARCH) in which the average of the conditional correlations is set to equal to the average of all pair correlations. Consider a vector of *n* return series $r_t = [r_{1,t}, ..., r_{n,t}]$, we estimate the following mean equation:

$$r_t = \mu + \varphi r_{t-1} + \varepsilon_t \,, \tag{1}$$

where μ is a vector of constant terms, and $\varepsilon_t = [\varepsilon_{1,t}, \dots, \varepsilon_{n,t}]$ is the vector of residuals. Next, we use estimate the conditional volatilities $h_{i,t}^2$ from univariate GARCH (1,1) process as specified in Eq. (2).

$$h_{i,t}^{2} = \omega + \alpha \varepsilon_{i,t-1}^{2} + \beta h_{i,t-1}^{2}$$
(2)

where $\omega > 0$, $\alpha \ge 0$, and $\beta \ge 0$, and $\alpha + \beta < 1$. In order to obtain the dynamic correlations between the analysed variables, we review the DCC model of Engle (2002). Assume that $E_{t-1}[\varepsilon_t]=0$ and $E_{t-1}[\varepsilon_t \varepsilon'_t]=H_t$, where $E_t[\cdot]$ is the conditional expectation on using the information set available at time *t*. The conditional variance-covariance matrix, H_t , can be written as:

$$H_t = D_t^{1/2} R_t D_t^{1/2},$$
(3)

where $R_t = [\rho_{ij,t}]$ is the conditional correlation matrix, while the diagonal matrix of the conditional variances is given by $D_t = diag(h_{i,t}, \dots, h_{n,t})$. Engle (2002) models the right-hand side of Eq. (3) rather than H_t directly by proposing the following dynamic correlation structure:

$$R_{t} = \{Q_{t}^{*}\}^{-1/2} Q_{t} (Q_{t}^{*})^{-1/2}$$
(4)
$$Q_{t}^{*} = diag[Q_{t}],$$
(5)

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$$Q_{t} = \left[q_{ij,t}\right] = (1 - a - b)S + au_{t-1}u'_{t-1} + bQ_{t-1} ,$$
(6)

where $u_t = [u_{i,t}, ..., u_{n,t}]$ is the standardized residuals, i.e., $u_{i,t} = \varepsilon_{i,t} / h_{i,t}$, $S = [s_{ij}] = E[u_t u_t']$ is the $n \times n$ unconditional covariance matrix of u_t , and a and b are non-negative scalars satisfying a + b < 1. The resulting model is called DCC.

In this context, Aielli (2013) proves that the estimation of the covariance matrix Q_t by this way is inconsistent since $E[R_t] \neq E[Q_t]$ and suggests the following consistent model with the correlation-driving process (cDCC):

$$Q_{t} = (1 - a - b)S^{*} + a(Q_{t-1}^{*1/2}u_{t-1}u_{t-1}'Q_{t-1}^{*1/2}) + bQ_{t-1},$$
(7)

where S^* is the unconditional covariance matrix of $Q_t^{*1/2}u_t$.

Engle and Kelly (2012) suggest to model ρ_t by using the cDCC process to obtain the conditional correlation matrix Q_t and then taking the mean of its off-diagonal elements. This approach, which reduces the estimation time, is called the dynamic equicorrelation (DECO) model. The scalar equicorrelation is defined as:

$$\rho_t^{DECO} = \frac{1}{n(n-1)} \Big(J_n' R_t^{cDCC} J_n - n \Big) = \frac{2}{n(n-1)} \sum_{i=1}^{n-1} \sum_{j=i+1}^n \frac{q_{ij,t}}{\sqrt{q_{ii,t}q_{jj,t}}}$$
(8)

where $q_{ij,t} = \rho_t^{DECO} + a_{DECO} (u_{i,t-1} u_{j,t-1} - \rho_t^{DECO}) + b_{DECO} (q_{ij,t} - \rho_t^{DECO})$, which is the (i, j)th element of the matrix Q_t from the cDCC model. We then use this scalar equicorrelation to estimate the conditional correlation matrix:

$$R_t = (1 - \rho_t)I_n + \rho_t J_n,$$

where J_n is the $n \times n$ matrix of ones and I_n is the *n*-dimensional identity matrix.

Data and summary statistics

This paper considers the weekly Friday closing prices for nine emerging sovereign CDSs, namely Brazil, China, Indonesia, Korea, Malaysia, Philippines, Russia, South Africa (S.Africa) and Thailand, covering from 7 January 2005 to 15 July 2016. The sovereign CDS spreads were based on the most liquid 5-year tenor provided by the database of Markit Group (www.markit.com), which collects corporate and sovereign CDS quotes from more than 30 large banks on a daily basis.

We calculate the continuously compounded weekly returns by taking the difference in the logarithms of two consecutive prices. We also use the ICSS algorithm of Inclán and Tiao (1994) to identify the scope of structural breaks and their effect in causing sudden jumps in returns. Figure 1 displays the points of sudden changes in the return dynamics of nine CDSs, particularly during the most severe periods of the GFC and ESDC. We can see two important structural breaks in the conditional variance of the six commodity futures markets: the GFC (11/23/2007–05/22/2009), and the ESDC (11/05/2009–04/22/2010). These structural breaks might affect the spillover effect among these CDS markets.

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Figure 1: Sudden changes in the return dynamics of the nine emerging CDS markets. Note: The dotted lines define the ±3 standard deviation bands around the structural break points estimated by the ICSS algorithm.

Empirical results

Table 1 presents the estimation results for the DECO-GARCH(1,1) model across nine emerging CDS markets. In panel A of Table 1, the terms of ARCH and GARCH are significant and the sum of ARCH and GARCH terms are very close to unity, implying the high persistence referring to the IGARCH model. This evidence indicates that the volatility in the GARCH model displays high persistence in the nine emerging markets.

Panel B of Table 1 reports the estimates of the DECO model. The parameter a_{DECO} is positive and significant, indicating the transmission of shocks across nine emerging CDS markets. The parameter b_{DECO} is significant and very close to one for all cases, confirming the higher persistence of volatility across nine emerging CDS markets. Taking together, the significance of the parameters, a_{DECO} and b_{DECO} , justifies the appropriateness of the DECO-GARCH model. Specifically, the dynamic equicorrelation is positive with a value of 0.6068, indicating the high correlation across these CDS markets.

According to the diagnostic tests (Panel C), the Ljung-Box test statistics for the standard residuals and the squared standardized residuals do not reject the null hypothesis of no serial correlation for all cases, providing evidence of no misspecification of our model. Moreover, the Hosking² (20) and McLeod-Li² (20) test results suggest acceptance of the null hypothesis of no serial correlation in the conditional variances estimated by the DECO-GARCH model and, therefore, there is no evidence of statistical misspecification in the DECO-GARCH model.

Figure 2 displays the dynamic equicorrelation across nine emerging CDS markets. We can see the jump point which corresponds to the break date September 15, 2008 (the Lehman Brothers collapse). As shown in this figure, we observe time-varying correlations over the sample period, meaning that investors change frequently their portfolio structure. More importantly, the equicorrelation level sharply increases during the years 2008-2012 that correspond to the recent financial crises (GFC and ESDC). This result also supports the recoupling hypothesis (contagion effects). This effect can be particularly visible during periods of turmoil which diminishes the benefits of international portfolio diversification for investors.

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	Brazil	China	Indonesia	Korea	Malaysia	Philippines	Russia	S. Africa	Thailand		
Panel A: Estimates of the univariate GARCH model											
Const.(M)	-0.0041	-0.0060	-0.0067	-0.0082	-0.0025	-0.0058**	-0.0045	-0.0029	-0.0007		
	(0.0027)	(0.0038)	(0.0037)	(0.0071)	(0.0025)	(0.0028)	(0.0036)	(0.0032)	(0.0034)		
AR(1)	-0.0388	-0.0604	-0.0143	0.0422	-0.0434	-0.0721	0.0551	-0.0362	0.0521		
	(0.0522)	(0.0707)	(0.0691)	(0.0549)	(0.0412)	(0.0527)	(0.0489)	(0.0508)	(0.0582)		
Const. (V)	0.0008^{***}	0.0006	0.0029^{***}	0.0039^{***}	0.0004^{**}	0.0007^{***}	0.0023^{***}	0.0014	0.0006^{**}		
	(0.0002)	(0.0005)	(0.0008)	(0.0012)	(0.0001)	(0.0002)	(0.0007)	(0.0016)	(0.0003)		
ARCH	0.2445^{***}	0.3640^{***}	0.4602^{***}	0.5164^{***}	0.1464^{**}	0.2786^{***}	0.1958^{***}	0.2775^{***}	0.1902^{***}		
	(0.0875)	(0.0249)	(0.0288)	(0.0437)	(0.0613)	(0.1079)	(0.0553)	(0.0161)	(0.0134)		
GARCH	0.6646***	0.6650^{***}	0.2233***	0.2061***	0.8337^{***}	0.6500^{***}	0.5554^{***}	0.5783^{***}	0.7436^{***}		
	(0.0657)	(0.1615)	(0.0202)	(0.0180)	(0.0513)	(0.0634)	(0.0907)	(0.0300)	(0.1085)		
Panel B: Estim	nates of the DI	ECO model									
Average	0.6068^{***}										
CORij	(0.2026)										
a_{DECO}	0.0192^{*}										
	(0.0114)										
$b_{\scriptscriptstyle DECO}$	0.9807^{***}										
	(0.0150)										
Panel C: Diagnostic tests											
Q(20)	21.461	27.862	18.582	19.453	9.2546	15.070	22.514	24.706	34.601		
	[0.3704]	[0.1126]	[0.5491]	[0.4925]	[0.9690]	[0.7260]	[0.3132]	[0.2129]	[0.0223]		
$Q^{2}(20)$	28.125	14.762	14.275	21.421	5.9210	8.2428	10.803	10.551	9.3003		
	[0.1064]	[0.7898]	[0.8162]	[0.3727]	[0.9989]	[0.9901]	[0.9025]	[0.9570]	[0.9791]		
Hosking ² (20)	1608.43										
_	[0.5623]										
McLeod-Li ²	1609.40										
(20)	[0.5555]										

Table 1: Estimation of the DECO-GARCH(1,1) model

Notes: Q(20) and $Q^2(20)$ are the Ljung-Box test statistics applied to the standard residuals and the squared standardized residuals, respectively. Hosking² (20) and McLeod-Li² (20) multivariate Portmanteau statistics test the null hypothesis of no serial correlation in squared standardised residuals (20 lags). The asterisks ** and *** indicate significance at the 5% and 1% levels, respectively. The p-values are in brackets and the standard errors are in parentheses.





Figure 2: Dynamic equicorrelation among the nine emerging CDS markets

Conclusion

This paper examines the spillover effects across nine emerging sovereign CDSs, namely Brazil, China, Indonesia, Korea, Malaysia, Philippines, Russia, South Africa (S.Africa) and Thailand by employing the multivariate DECO-GARCH model of Engle and Kelly (2012). In addition, we also identify potential structural breaks, such as the global financial crisis of 2007-2008 (GFC) and the European sovereign debt crisis of 2010-2012 (ESDC). In particular, we investigate the time-varying dynamics of equicorrelation that reveal the intensity of transmission during the recent financial crises, i.e. the GFC and ESDC. We found a positive equicorrelation across nine emerging sovereign CDSs. This evidence supports the recoupling hypothesis (contagion effects). These trends are more pronounced in the aftermath of the recent financial crises (GFC and ESDC), indicating that the intensity of spillovers during periods of turmoil diminishes diversification benefits.

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Connectedness network across emerging Sovereign CDS markets

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Abstract

We examine interconnectedness network of credit risk across nine emerging sovereign credit default swap (CDS) markets using the spillover index model of Diebold and Yilmaz. Using weekly data from 2005 to 2016, we measure spillover index of sovereign default risk in nine CDS markets and find strong contagion effects among these CDS markets. In addition, we also find the pairwise directional spillover across these CDS markets. The net pairwise directional spillover identifies that China, Indonesia, Korea, Malaysia and Philippines are identified as the net transmitter, while remaining other markets (including Brazil, Russia, S.Africa and Thailand) are net receivers of spillovers. Finally, the risk spillover network connectedness confirm the most of Asian countries are net contributors of risk transmission, which can be a useful to determine superior investment decisions and to create trading strategies for portfolio investors.

Keywords: Risk spillovers; directional and spillover index; Financial crisis; Connectedness network

Main Conference Topic: Financial Economics

Introduction

The 2008 global financial crisis (GFC) which triggered by 2007 U.S. subprime mortgage crisis and was widely spread to global real economics is an example of an extreme negative risk event that lead to increase the sovereign credit risk in Eurozone, referred as European sovereign debt crisis (ESDC). These GFC and European sovereign debt crisis (ESDC) have intensified the need for an exhaustive measure of sovereign credit/default risk connectedness. Since there are many channels (some of which cannot be directly observed) through which a shock in one country can affect others, estimating these connectedness is central to risk transmission and management for academics and practitioners in modern financial field (Bostanci, & Yilmaz, 2015).

Sovereign credit risk affects both risk premiums (e.g. borrowing costs) and a country's ability to access global debt markets. The nature of sovereign credit risk renders to determine the capital flow and its cost structure across countries as well as diversify the risk of global debt portfolios (Longstaff et al., 2011). A relatively new financial instrument, Credit Default Swaps (CDSs), has been used to measure sovereign default probabilities. Sovereign CDS

contracts function as insurance contracts that allow investors to buy protection against the event that a sovereign defaults on or restructures its debt. The buyer (the bondholder) of CDS makes regular premium payments to the seller, the premium amounts constituting the spread charged by the seller to insure against a credit event (Hull, Predescu, & White, 2004). In literature, sovereign CDS spreads are highly correlated with global market factors, risk premiums, and liquidity patterns, implying susceptibility to global financial conditions (Chan, Fung, & Zhang, 2009; Grammatikos, & Vermeulen, 2012).

This paper attempts to extend the empirical studies, with the intensity and direction of contagion effects across nine emerging sovereign CDS markets namely, Brazil, China, Indonesia, Korea, Malaysia, Philippines, Russia, South Africa, and Thailand. Our study contributes to the existing literature in the following aspects. First, we investigate the intensity of return spillover indexes by employing the forecast-error variance decomposition framework of a VAR model proposed by Diebold, & Yilmaz (2014). This method measures the magnitude of return spillovers across nine emerging CDS markets. Second, we decompose the spillover index into directional 'from' ('to') of spillovers to calculate the net pairwise direction and reverse direction over time, the net spillovers might identify who is a pure 'recipient' or 'transmitter' of risk spillovers across these sovereign CDS markets. Finally, we consider the market connectedness network to identify the channels of risk spillovers across pairwise markets. Thus, above findings on the risk spillovers can be used to evaluate the potential selection of risk-adjusted portfolio returns and thus can provide new information on superior portfolio investment decisions for international and domestic investors.

The remainder of this study is organized as follows. Section 2 discusses the methodology used in this study. Section 3 describes the data and conducts some preliminary analysis. Section 4 reports the empirical results. Section 5 provides concluding remarks.

Econometric modeling framework

We apply the generalized VAR methodology, variance decomposition and the generalized spillover index of Diebold, & Yilmaz (2014), to examine the directional spillovers and net spillovers across stock markets. Following Diebold, & Yilmaz (2014), we assume a covariance stationary n-variable VAR(p):

$$y_t = \sum_{i=1}^p \Phi_i y_{t-1} + \varepsilon_t, \tag{1}$$

where y_t is $N \times 1$ vector of endogenous variables, Φ_i are $N \times N$ autoregressive coefficient matrices and ε_t is a vector of error terms that are assumed to be serially uncorrelated. The VAR model contains six variables (N = 9), namely the returns of nine emerging CDS spreads.

If the VAR system above is a covariance stationary, a moving average representation is written as $y_t = \sum_{j=0}^{\infty} A_j \varepsilon_t$, where the $N \times N$ coefficient matrices A_j obey a recursion of the form $A_j = \Phi_1 A_{j-1} + \Phi_2 A_{j-2} + \ldots + \Phi_p A_{j-p}$, with A_0 being the $N \times N$ identity matrix and $A_j = 0$ for j < 0. The total, directional and net spillovers are generated by the generalized forecasterror variance decompositions of the moving average representation of the VAR model. The framework of generalized variance decompositions is able to eliminate any possible dependence of the results on the ordering of the variables.

The H-step-ahead generalized forecast-error variance decomposition is written as:

 $\theta_{ij}(H) = \frac{\sigma_{jj}^{-1} \sum_{h=0}^{H-1} (e'_i A_h \sum e_j)^2}{\sum_{h=0}^{H-1} (e'_i A_h \sum A'_h e_i)} , \qquad (2)$

where Σ is the variance matrix of the vector of errors ε , and σ_{ij} is the standard deviation of the error term of the *j*th equation. Finally, e_i is a selection vector with one on the *i*th element, and zero otherwise. The yields a $N \times N$ matrix $\theta(H) = [\theta_{ij}(H)]_{i,j=1,2}$, where each entry gives the contribution of variable *j* to the forecast error variance of variable *i*. The ownvariable and cross-variable contributions are contained in the main diagonal and the offdiagonal elements of $\theta(H)$ matrix, respectively.

Since the own and cross-variable variance contribution shares do not sum to one under the generalized decomposition, i.e., $\sum_{j=1}^{N} \theta_{ij}(H) \neq 1$, each entry of the variance decomposition matrix is normalized by its row sum, as follow:

$$\widetilde{\theta}_{ij}(H) = \frac{\theta_{ij}(H)}{\sum_{j=1}^{N} \theta_{ij}(H)},$$
(3)

with $\sum_{j=1}^{N} \theta_{ij}(H) = 1$ and $\sum_{j=1}^{N} \theta_{ij}(H) = N$ by construction.

This ultimately allows defining a total spillover index as:

$$TS(H) = \frac{\sum_{i,j=1,i\neq j}^{N} \widetilde{\theta}_{ij}(H)}{\sum_{i,j=1}^{N} \widetilde{\theta}(H)} \times 100 = \frac{\sum_{i,j=1,i\neq j}^{N} \widetilde{\theta}_{ij}(H)}{N} \times 100,$$
(4)

This index measures the average contribution of spillovers form shocks to all (other) markets to the total forecast error variance. In addition, this index is flexible and allows obtaining the directional spillovers among all markets.

Data and summary statistics

This paper considers the weekly Friday closing prices for nine emerging sovereign CDSs, namely Brazil (BAL), China (CHN), Indonesia (IDN), Korea (KOR), Malaysia (MAL), Philippines (PHP), Russia (RUS), South Africa (SAF), and Thailand (THA), covering from 7 January 2005 to 15 July 2016. The sovereign CDS spreads were based on the most liquid 5-year tenor provided by the database of Markit Group (www.markit.com), which collects corporate and sovereign CDS quotes from more than 30 large banks on a daily basis. Figure 1 displays the dynamics of the nine sovereign CDS spreads over the sample period. We observe a similar trend for all nine sovereign CDS markets with a sharp decline from early 2007 subprime mortgage crisis to the summer of 2008, corresponding to the GFC. It clearly shows that, prior to September 2008, the CDS spreads were generally stable in almost all countries. The critical crisis threshold for CDS was the Lehman bankruptcy on 15 September, 2008, after which spreads for all of the countries increased very sharply. In early 2009, the global markets experienced macroeconomic deterioration followed by a phase of stabilization and tentative signs of recovery in late 2009. After this, the price trend has suffered congestion due to the outbreak of the ESDC during 2009-2012.



Figure 1: Dynamics of nine emerging CDS spreads

Empirical results

Table 1 reports the pairwise directional matrix of CDS returns. All results are based on vector autoregressions of order 4, and generalized variance decompositions of 10 week ahead forecast errors. Table 1 summarizes the total static spillover index among the nine emerging CDS returns and decomposes it by transmitters and receivers of return spillovers. It also measures the extent to which the variables are net return transmitters or net receivers. As shown in Table 1, the total return spillover index indicates average 81.50% of returns forecast error variance and shows the bi-directional return spillover effect across all nine CDS markets. More specifically, we identify that both Malaysia (MAL) and Indonesia (IDN) are the largest contributors to other countries. It contributes to the other markets on average by 106%, while it receives from the other markets 82%. Hence, in net terms, it contributes 6% more to the other market returns than it receives form the other market returns. The second largest contributor is the Philippines (PHP), with the net contribution estimated at 6%, followed by Korea (KOR; 5%) and China (CHN; 3%). However, the other markets (Brazil, Russia, S.Africa, and Thailand) are net receivers because their contributions to the all other markets less than they receive from all other markets. In particular, Russia (RUS) and S.Africa (SAF) are the largest recipients of spillovers, with the net contributions estimated at -10.7% and -8.6%, respectively. Overall, the net pairwise direction spillover indicates that China, Indonesia, Korea, Malaysia and Philippines are identified as the net transmitter, while remaining other markets (including Brazil, Russia, S.Africa and Thailand) are net receivers of spillovers.

Sovereign CDS markets have increasingly become more complex due to ongoing financial crises, which have affected the world economy and the global financial architecture. This complex system is a tough challenge that requires hedging through diversifying and other measures to provide financial stability. In this context, we consider the complex network system, to identify the channels of connectedness across sovereign CDS markets. Fig. 2 plots the risk spillover network across nine sovereign CDS markets based on the pairwise

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directional spillovers in Table 1. This figure shows that most of Asian sovereign CDS (red color nodes) are net transmitter of risk spillover and strongly connected with each other. In particular, Malaysia and Indonesia are the hub market of risk spillover across these markets. However, other markets (green color nodes) are net recipient of risk spillover and are weekly connected with each other. These results suggest that, the risk of Indonesia and Malaysia can help improve the channel of risk spillover other CDS markets.





Note: This figure shows the connectedness network among nine emerging sovereign CDS. The size of a node highlights that the magnitude of a net transmission/reception TO or FROM other variables. The red (green) color of a node shows that a variable is a net transmitter (receiver) in the system. The edge size underscores the magnitude of the pairwise directional spillover, while the magnitude is also reflected through the color type (geen (weak), light blue and blue (medium), wine and red (strong)).



	From									
То	BAL	CHN	IDN	KOR	MAL	PHP	RUS	SAF	THA	From Others
BAL	20.34	9.06	11.27	9.01	8.94	10.93	11.07	11.04	8.35	79.7
CHN	7.91	17.44	10.65	12.8	13.15	11.34	7.33	7.79	11.58	82.6
IDN	9.55	10.49	17.2	11.31	10.45	12.5	8.74	9.79	9.97	82.8
KOR	7.73	12.54	11.26	17.13	13.16	10.78	7.98	8.33	11.09	82.9
MAL	7.69	12.68	10.31	13.1	17.09	11.29	7.22	7.91	12.71	82.9
PHP	9.17	11.14	12.41	10.8	11.57	17.54	8.06	8.74	10.57	82.5
RUS	11.58	8.98	10.73	9.62	8.79	9.93	21.17	11.84	7.35	78.8
SAF	10.81	9	11.41	9.55	9.37	10.46	11.14	20.01	8.25	80
THA	7.8	12.1	10.71	12	13.64	11.22	6.57	7.6	18.37	81.6
To Others	72.3	86	88.8	88.2	89.1	88.4	68.1	73	79.9	734
All	92.6	103.4	106	105.3	106.2	106	89.3	93.1	98.3	Total : 81.50
Net	-7.4	3.4	6	5.3	6.2	5.9	-10.7	-8.6	-1.7	
Conclusion	Net-	Net-	Net-	Net-	Net-	Net-	Net-	Net-	Net-	
	recipient	contributor	contributor	contributor	contributor	contributor	recipient	recipient	recipient	

Table 1: Pairwise directional return spillover index

Notes: The underlying variance decomposition is based on a daily VAR of order 4 (as determined by the Schwarz information criterion) using the generalized VAR spillover framework suggested by Diebold and Yilmaz (2012). The (i,j)th element of the table shows the estimated contribution to the variance of the 10-day-ahead forecast error of *i* coming from innovation shocks to variable *j*. The diagonal elements (i=j) are the own variance share estimates, which show the fraction of the forecast error variance of market *i* that is due to its own shocks. The last column "**From others**" shows the total spillovers received by a particular market from all other markets, while the row "**To others**" shows the spillover effect directed by a particular market to all other markets. The lower right corner "**Total**" indicates the level of total spillovers.



Conclusion

This paper examines the risk spillover and interconnectedness across nine emerging sovereign CDS markets (Brazil, China, Indonesia, Korea, Malaysia, Philippines, Russia, South Africa, and Thailand) by employing the spillover index model of Diebold and Yilmaz (2012). In particular, we investigate the intensity and direction of risk transmission and reveal the network connectedness across these sovereign CDS markets. Our empirical results are summarized as follows. First, we measure the pairwise directional spillover across these sovereign CDS markets (Indonesia, Korea, Malaysia and Philippines) are net transmitters of risk spillovers to the other markets, while the remaining other markets are net receivers of risk spillovers. Third, the network system shows that both Indonesia and Malaysia is the most influence markets of risk spillover across pairwise countries. These results suggest that, the risk of Indonesia and Malaysia can help improve the channel of risk spillover other CDS markets.

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Risk Characteristic on Fat-Tails of Return Distribution: an Empirical Evidence on a Korea

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Abstract

This study empirically investigates the characteristic of fat-tails in return distributions focusing on uncovering the economic implications of the risk property included in the tails of return distributions based on the devised statistical methods. According to the results, the risk property in the fat-tails of return distributions has the economic meanings of eigenvalues having a value greater than 1 through principal component analysis (**PCA**), and also systematic risk that cannot be removed through portfolio diversification. These results suggest that the fat-tails of return distributions have the properties of the common factors, which may explain the changes of stock returns. On the other hand, the fatness of the tails in the portfolio return distributions: that is, the negative tail in the portfolio return distributions has a much closer relation with the properties of common factors, compared to the positive tail. Our empirical evidence may complement the existing studies related to tail risk which is utilized in pricing models as a common factor.

Keywords: Stock return distributions, Characteristic of fat-tails, Principal component analysis, Portfolio diversification, **Main Conference Topic:** Risk Management

Introduction

The extensive losses arising from the financial market crashes such as the 1997 Asian financial crisis, the 2008 U.S. credit risk and the 2011 European debt crisis have been raising basic questions about the capability of effective risk management based on the existing models in the field of finance. The risk property included in the tails of return distributions needs to be identified to improve traditional risk management. The pricing models in the field of finance usually struggle to explain the changes of returns using systematic risks of common factors. Determining whether to include the risk property in the fat-tails of return distributions, i.e., whether to have economic meanings of common factors that can explain the changes of returns, and whether to have the property of systematic risk not be removed by portfolio diversification. However, no consensus has yet been reached about whether the risk property in the fat-tails of returns as a common factor. This necessitates research which in advance defines the economic



implications of the risk property included in the fat-tails of return distributions in order to expand the pricing model reflecting the characteristic of fat-tails.

This study empirically investigates the risk characteristic of fat-tails in return distributions in order to determine the evidence that supports the economic implications of the risk property included in the fat-tails of return distributions based on statistical methods. The fatness of the tails in return distributions is quantitatively measured by statistical probability, in which the number of return data belonging to each end-area deviated from central section of 99% in the distribution is divided by the total number of return data in the distribution. We devised empirical designs based on two traditional methods: principal component analysis (PCA) in multivariate statistics by King (1966) and Ross (1976) and the testing method of portfolio diversification effect by Evans and Archer (1968). As reported by Brown (1989), Plerou et al. (2002), and Eom et al. (2009), the eigenvalue with a value greater than 1 among all eigenvalues extracted by PCA has the economic meaning of being able to explain the changes of return in pricing model, such as market, industry and macroeconomic factors. We test whether the magnitude of eigenvalues is positively correlated with the fatness of the tails in the distribution of the eigenvalue time series. This is evidence suggesting that the risk property included in the fat-tails of return distributions may have the economic meanings of eigenvalues with a value greater than 1 statistically. As a test of the portfolio diversification effect in Elton and Gruber (1977) and Staman (1987), the type of systematic and unsystematic risk can be visually determined by changing the pattern of portfolio risks as the number of stocks in a portfolio increases. The tails of portfolio return distributions have return data from large-scale price fluctuations deviated from the average value and, therefore, the change of the fatness of the tails in portfolio return distributions is very closely related with the portfolio risks. A continuous decreasing pattern of portfolio risks with an increasing number of stocks in a portfolio indicates a property of unsystematic risk, whereas a pattern of converging into a certain level of portfolio risks indicates a property of systematic risk. Identifying the type of changing patterns of the fatness of the tails in portfolio return distributions might be evidence determining whether the risk property in the fat-tails of return distributions is systematic or unsystematic risk.

The results are summarized briefly as follows. The relationship between the magnitude of eigenvalue and the fatness of the tails in the distribution from the eigenvalue time series is positive through PCA. This means that the eigenvalues with higher value tend to have much fatter tails in the distribution of the eigenvalue time series. When using the testing method for portfolio diversification effect, we discovered that the fatness of the tails in portfolio return distributions tends to converge to a certain level. This evidence may support that the risk property included in the fat-tails of return distributions has the systematic risk that cannot be removed by portfolio diversification. An interesting finding is that the negative tail is much fatter than the positive tail in the portfolio return distribution according to increasing number of stocks in a portfolio. This result is due to the different strength of relation with common factors in each tail of the portfolio return distribution; that is, the negative tail has a much closer relation with the properties of the common factors rather than the positive tail in the portfolio return distribution. Also, this evidence suggests the potential defect of traditional portfolio investment that suffers from the limitations of missing the opportunity for large profits in the positive tail and of taking large losses in the negative tail. In this study, the uncovered economic implications of the risk property included in the fat-tails of return distributions will complement existing studies (e.g., Kelly and Jiang 2014) of tail risk which is utilized in pricing models as a common factor. Therefore, we expect that our findings will provide new insights.



Empirical Design

Data and Periods

In this study, we utilized the returns of the market and individual stocks traded in the Korean stock market from July 2006 to June 2015. We set three stock groups classified by market capitalization of firms. Since the study of Banz (1981), firm size is one of the key factors to explain the changes of stock returns, and so we divided the stocks into three groups: the all stocks group, the large stocks group (the top 40%), and the small stocks group (the bottom 40%).

Methods

This section describes the main contents of the methods for identifying the economic implications of the risk property included in the fat-tails of return distributions. By using the standardized return data, the tails are defined by the area of each end-side deviated from central section of 99% in the frequency distribution. We utilize the statistical probability as a measurement to assess the fatness of the tails in return distributions. The statistical probability is the relative frequency (f_N/f_T) ratio, calculated as the number of data (f_N) included in the tails of the distributions by the statistical probability having a value greater than 0.5%. To identify the economic implications of the risk property included in the fat-tails of return distributions, the devised methods are based on traditional methods of PCA and the portfolio diversification effect. PCA is used to explore statistically the common factors based on eigenvalues having a value greater than 1, and the portfolio diversification method presents a theoretical basis for the pricing models that is strongly reliant on systematic risk.

The first devised method is based on the PCA method. The PCA is a useful tool to extract potential common factors from the return data of all stocks. The number of eigenvalues (λ_k , k = 1,2,...N) extracted by PCA using the returns of all stocks is the same as the number of N stocks. As reported by Brown (1989), Plerou et al. (2002), and Eom et al. (2009), the eigenvalues with a value greater than 1 based on the Kaiser (1960) criterion have economic meanings. We empirically examine the relationship between the magnitude of eigenvalues and the fatness of the tails in the distribution of the eigenvalues time series. If the magnitude of eigenvalues is positively correlated with the fatness of the tails in the distribution of the eigenvalue time series, this is evidence suggesting that the risk property in the fat-tails of return distributions has economic meanings of eigenvalues with a value greater than 1, statistically. The testing process is as follows. We extract all eigenvalues using PCA, and then create the time series $(R_{k,t}^{\lambda})$ of each eigenvalue. The time series of each eigenvalue is created by multiplying eigenvectors (v_k) assigned to the k-th stock to stock return $(R_{j=k,t})$ in time t; that is, $R_{k,t}^{\lambda} = \sum_{i=1}^{N} v_k R_{k,t}$, t = 1,2,...,T. Using standardized data, we calculate the statistical probability (f_N/f_T) as the measurement on the fatness of the tails in the distribution. We then test the relationship between the magnitude of eigenvalue and the statistical probability on the tails of the eigenvalue distribution using correlation analysis.

The second devised method is based on the testing method of portfolio diversification effect. The effect of portfolio diversification based on Evans and Archer (1968) is defined by the reduction of portfolio risk as the number of stocks in a portfolio increases. The fatness of the tails in portfolio return distributions is very closely related with portfolio risk. We investigate the changing pattern of the fatness in the tails of portfolio return distributions through the testing method for the portfolio diversification effect. If the fatness of the tails in portfolio return distributions clearly converges to a certain level with an increasing number of stocks in the portfolio, then this is evidence suggesting that the risk property in the fat-tails of portfolio return distributions is a systematic risk that cannot be removed by portfolio



diversification. The testing process is as follows. We set the number of stocks in a portfolio using the range from at least 2 to a maximum of 50. In each stock in a portfolio, we calculate the portfolio returns from each of 100 cases of a portfolio constructed by randomly selected stocks based on the sampling with non-replacement. Using standardized portfolio returns, we calculate the statistical probability (f_N/f_T) as the measurement on the fatness of the tails in the portfolio return distribution, and the average value of the 100 statistical probabilities is calculated in each stock in a portfolio. We then investigate the changing patterns of the average value from statistical probability according to the increasing number of stocks in the portfolio.

Results

The implications of fat-tails in risk management

In this section, we present our results for the economic implications of the risk property included in the fat-tails of return distributions. We utilize two traditional methods: PCA and the testing method of portfolio diversification. We present the results observed from each method in Figures 1 and 2.



Figure 1. Economic implications using eigenvalues through the PCA method

The figure shows the results on the relationship between the magnitude of eigenvalue and the fatness of the tails in the distribution of the eigenvalue time series for all stocks group with 524 stocks and in the period from July 2006 to June 2015. In the figure, the X-axis indicates the magnitude of eigenvalues, and the Y-axis denotes the statistical probability in the tails of the eigenvalue distribution. Figure 1(a) and 1(b) show the negative tail, and Figure 1(c) and 1(d) the positive tail. In addition, to control for the excessive effect of the largest eigenvalue (\Rightarrow) on the results, Figure 1(a) and 1(c) show the results including the largest eigenvalue by double-log plot, and Figure 1(b) and 1(d) show the results excluding the largest eigenvalue by scatter plot.

First, we present the results uncovering the risk property in the fat-tails of return distributions through PCA. Determining whether or not eigenvalues extracted from PCA have an economic meaning is strongly reliant on the magnitude of the eigenvalues. Thus, we investigate the relationship between the magnitude of eigenvalues and the fatness of the tails in the distribution from the eigenvalue time series. The positive relationship means that eigenvalues with a higher value tend to have fatter tails in the eigenvalue distribution, which is evidence suggesting that the risk property in the fat-tails of return distributions has economic meaning of eigenvalues with a value greater than 1, statistically. The results are shown in Figure 1. The figure shows N=524 stocks belonging to all stocks group over the period from July 2006 to June 2015. Thus, the number of eigenvalues extracted from PCA is K=524, and the time series data with the property of each of the eigenvalues has the same



length of the period. The statistical probability is used to measure the fatness of the tails in the distribution of the eigenvalue time series. In addition, we control the effect from the largest eigenvalue that can substantially affect the result. This is because the difference of the value between the largest eigenvalue and the second largest eigenvalue is very high, as known in Brown (1989) and Eom et al. (2009).

According to the results, the magnitude of eigenvalues has a clearly positive relationship with the fatness of the tails in the distribution of the eigenvalue time series. In Figure 1(a) and 1(b), the strength of the relationship for the negative tail is 32.17% and 43.01%, respectively, and the strength of relationship for the positive tail in Figure 1(c) and 1(d) is 16.31% and 57.64%, respectively. The relationship excluding the largest eigenvalue has a higher value compared to the relationship including the largest eigenvalue; that is, the positive relation is obvious in figures. The results on large stocks group ((a)&(b), 37.47% & 34.34%; (c)&(d), 19.14% & 66.43%) and small stocks group (41.87% & 22.99%; 14.04% & 49.02%) that are not reported in this paper also present the same positive relationship. These results are evidence suggesting that the risk property included in the fat-tails of return distributions has economic meaning of eigenvalues with a value greater than 1, statistically.

Next, we present results of testing whether the risk property in the fat-tails of return distributions is the systematic risk or unsystematic risk through the testing method of portfolio diversification. We empirically investigate the changes in the fatness of the tails in portfolio return distributions according to the increasing number of stocks in a portfolio. A pattern converging into a certain level indicates that the fat-tails of the portfolio return distribution have the property of systematic risk. The results are shown in Figure 2. The figure presents results using all return data of three stock groups over the period from July 2006 to June 2015. The measurement on the fatness of the tails in the portfolio return distribution is the statistical probability.



Figure 2. Economic implications using the testing method of portfolio diversification effect The figure shows the results on the changing pattern on the fatness of the tails in the portfolio return distribution as the number of stocks in a portfolio increases, using three stock groups over the period from July 2006 to June 2015. The results are using the stock return data of all stocks group (\circ), large stocks group (\Box), and small stocks group(Δ). The statistical probability is used as the quantitative measurement on the fatness of the tails in the portfolio return distribution. In the figure, the X-axis denotes the number of stocks in a portfolio from at least 2 to a maximum of 50, and the Y-axis indicates the average values of statistical probabilities calculated from 100 simulations. The results are separately presented for the negative tail ($\bullet, \blacksquare, \blacktriangle$) and positive tail (\circ, \square, Δ).

From Figure 2, regardless of stock groups, the statistical probability on the fatness of the tails in the portfolio return distribution tends to converge into a certain level as the number of stocks in the portfolio increases. This means that the risk property included in the tails of the portfolio return distribution is not completely removed through portfolio diversification, that is, the property of systematic risk. On the other hand, the interesting finding is that the changing patterns in the fatness of the tails in the portfolio return distribution show opposite



behavior between the negative and positive tails. As the number of stocks in a portfolio increases, the statistical probability in the positive tail has a decreasing pattern converging to a certain level, while the statistical probability in the negative tail has an increasing pattern converging to a certain level. The decreasing pattern in the positive tail means that the traditional portfolio diversification misses the opportunity for large profits from frequent large-scale price changes in the financial market, whereas the increasing pattern in the negative tail means that the tradition portfolio diversification cannot avoid the possibility of large losses from large-scale price fluctuations in market crashes. Therefore, this finding suggests that the traditional portfolio diversification suffers from the limitations of not effectively controlling for the possibility of large losses and the opportunity of large profits.



Figure 3. Additional test for the effect of common factors on portfolio diversification The figure shows the results for the effect of the common factors on the portfolio diversification effect using the two-type return data, that is, the return data (\Box, \blacksquare) in Figure 3(a) having only the properties of common factors from the original return data (\Rightarrow , \bigstar), and the return data (\circ , \bullet in Figure 3(b)) removing only the properties of common factors from the original return data. In the figure, the negative tail (\blacksquare , \bullet , \bigstar) and the positive tail (\square , \circ, \Leftrightarrow) in the portfolio return distribution are separately presented. This figure utilizes the stocks of all stocks group over the period from July 2006 to June 2015. The X-axis denotes the number of stocks in a portfolio from at least 2 to a maximum of 50, and the Y-axis indicates the average values of statistical probabilities calculated from 100 simulations.

Robustness and Discussion

This study empirically verified that the fat-tails of return distributions have the economic meanings of eigenvalues having a higher value than 1 statistically, and the property of systematic risk that cannot be removed through portfolio diversification. This evidence reveals that the property included in the fat-tails of return distributions has a close relationship with the properties of the common factor. This section presents the results of the additional test conducted to determine the reliability of our findings. The testing hypothesis is as follows: if the property of the fat-tails in return distributions is closely related to the properties of the common factors, the results are significantly dependent on whether or not to include the properties of the common factor in the return data. Based on the empirical design established for the research goal, we devise a method for testing the hypothesis. That is, the number of eigenvalues having the properties of the common factors is identified from the return data, and then, through the number of common factors, both the return data having only properties of the common factors in the original return data and the return data removing only properties of the common factors in the original return data are separately generated. Then, the same testing process employed in Figure 2 is performed using the two types of return data generated. The number of eigenvalues having the properties of the common factors is identified by the random matrix theory (RMT, Mehta (1995)), and the two types of return data with and without the properties of the common factors from the original return data are generated by the singular vector decomposition (SVD, Leon (2002)). All three



methods (PCA used for the second research goal and RMT and SVD for the additional test) share the use of eigenvalues to control for the various properties included in the return data. The main testing procedures for the testing hypothesis are briefly as follows. We check the number of common factors through RMT, and then generate the two-type return data with and without the property of common factor through SVD based on the RMT results. Finally, using each of the two-type return data generated, we perform the same testing process with Figure 2 of the portfolio diversification effect. The results are presented in Figure 3. The figure utilizes the return data of all stocks group in the period from July 2006 to June 2015, for the purpose of comparing with Figure 2. In the figures, Figure 3(a) is the result from the return data having only the properties of the common factors, and Figure 3(b) is the results from the return data removing only the properties of the common factors.

From Figure 3, we empirically verify the evidence to support the testing hypothesis. In other words, the properties included in the tails of return distributions are closely related to the properties of the common factors. In particular, the strength of relation with properties of common factors is much higher in the negative tail than in the positive tail of portfolio return distributions. The result of Figure 3(a) is very similar to the finding that is confirmed in Figure 2. According to the increasing number of stocks in a portfolio, the statistical probability on the tails of portfolio return distributions shows the pattern of a constant level without a specific change. This is clearly the pattern of the systematic risk that is not removed through portfolio diversification, due to using the return data having only the properties of the common factors. In addition, as shown in Figure 2, the statistical probability from the negative tail in the distribution of portfolio return has the much higher value, compared to the positive tail. On the other hand, the result of Figure 3(b) is clearly different from Figure 2. As the number of stocks in a portfolio increases, the statistical probability from the tails of the portfolio return distribution has a decreasing pattern and approaches a certain level. The pattern of the statistical probability on the positive tail in the portfolio return distribution does not differ from Figure 2. However, the pattern of statistical probability on the negative tail in the portfolio return distribution contrasts sharply with the results of Figure 3(a) as well as Figure 2. In other words, the statistical probability in the negative tail in the portfolio return distribution has a much smaller value than that in the positive tail. This result is strongly dependent on using the return data that do not have only the properties of the common factors. Consequently, Figure 3 is evidence supporting the hypothesis that the properties included in the tails of return distributions are closely related to the properties of the common factors, i.e., evidence to obtain the robustness for the results from Figure 2. Moreover, the properties of the common factors have a closer relationship with the negative tail in return distributions, compared to the positive tail. That is the asymmetric relation of the common factor on the tails of return distributions.

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Conclusion

This study has investigated the characteristic of fat-tails in return distributions in order to identify the economic implications of the risk property included in the fat-tails of return distributions in the Korean stock market over the period from July 2006 to June 2015. The risk property included in the fat-tails of return distributions has the economic meanings of eigenvalues with a value greater than 1 statistically, and the property of systematic risk that cannot be removed by portfolio diversification. In other words, the risk property included in the fat-tails of return distributions has economic implications of common factors that may commonly explain the changes of returns in the pricing model. Interestingly, the properties of the common factors have a closer relation with the negative tail, compared to the positive tail, in the portfolio return distribution, i.e., the asymmetric relation of common factor on the tails in return distribution. This finding is evidence suggesting the potential defect of the traditional portfolio investment that misses the opportunities to avoid large losses as well as to lose large profits. Our findings are robust regardless of the stock groups. Accordingly, the uncovered economic implications of risk property in the fat-tails of return distribution may complement the existing studies using tail risk as a common factor in pricing models. We hence expect these findings to provide new insight on improving portfolio investment.

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The Economic Impact of the Tourism Sector in Tunisia and its Managerial Perspectives

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Abstract

In many countries tourism has become a source of wealth and growth, this sector is perceived as a pillar of the national economy. This study examines causal relationships between tourism receipts and economic growth in Tunisia for the period 1965–2012. Granger causality test is used herein to assess the contribution tourism makes to economic growth. Our empirical results support the evidence on the direction of causality. The results indicate that only the tourism receipts affect GDP and not the other. Despite the importance of this sector, its contribution has slowed in recent years. Should therefore encourage manager's hotels to improve their strategic policies, diversify their products and gain a competitive advantage.

Keywords: Tourism Receipts, Economic Growth, Causality Test, Managerial Study

Main Conference Topic: Economic Growth, Managerial Economics

Introduction

Considered as a global booming business, tourism contributes by 11% of the world GDP. In many developing countries, this sector has become a key source of growth and wealth that affects directly and indirectly sectors linked to it as well as others. According to the World Tourism Organization (2004) tourism doubled between 1995 and 2005 and it has become itself for some small and medium-sized countries the exporting sector by excellence! Contributing massively to the national economic growth (Kim.HJ & AL, 2006), (Arslanturk.Y & Al, 2011). Such is the case of Tunisia; tourism has not been developed till after the independence, since it has gone through three phases from takeoff, the rise and then the crisis that persists till today. In this North African country, we acknowledge his undoubted importance marked by a considerable contribution in currency, a contribution to the trade balance and job creation especially among young people (Balaguer . Cantavella.M & J, 2002), (Dritsakis.N, 2004). For example, foreign exchange earnings recorded for the year 2010 amounted to 3522.5 million dinars against 3471.9 million dinars in 2009 and 3,400 in 2008 and contributed up to 7% of GDP. But in spite of all, it was overburdened by several problems, including strategic issues, rugged Mediterranean competition; problems related to the training of hotelkeepers and the shock from the attacks of September 11, 2001 and that of 2011, stricken due to the revolution. Where the Tunisian tourism is situated and is there a significant impact between the revenue from the latter and the economic growth of the country?

The originality of our work lies in the fact of having focus on the study of this relationship in Tunisian hotel industry over the period 1965 -. 2012 One area that hitherto has

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not attracted the attention of several researchers. This work could serve as a support to help revive the sector considered as one of the pillars of the national economy.

Review of the Literature

In a developing country such as Tunisia, tourism is seen as a sector or industry of primary importance when we look more closely at its multiple impacts. The revenue from this sector directly affects GDP, employment, due to its nature as a service activity, even if it turns out to be seasonal and does not require specific skills, the investment is either in the field or in areas that are related to it. However, knowing the exact impact of this sector on the national economy in order to identify the sources of success or failure still remains a challenge. Tourism consumption is spread across multiple sectors of the economy, and if the direct effects such as expenses incurred are known, it is certainly not the case for the indirect effects. In Tunisia it has an impact on agriculture, real estate, furniture, transportation and banking. This gives it a rating of "flagship" sector but not dominant. Thus, several studies have focused on the study of this phenomenon around the world. To determine the success of this sector and to measure or identify its impact on economic growth, remains a central issue around which several researchers focused. Our theoretical support allows us to review a significant number of jobs, starting with that of Gray (1966) who measured the elasticity of income / person on tourism demand in the U.S. and Canada, in order to assess the economic contribution of tourism. Like him, Bryden (1973), Heng & Low (1990) focused their research on the economic contribution of tourism in developing countries. As noted by Sinclair (1998) later on, all these works are bound by the estimation of tourism demand and therefore the generation of future income. This estimation is performed by resorting to simple equations for measuring tourism demand or arrivals. But further research submerging recently; Dwyer et al (2004), Ivanov & Webster (2007) were based on general equilibrium models as well as tourism satellite accounts to clarify the impact of tourism development. However, it should be noted that from 2002, the researchers are focusing more on the study of causality between tourism and economic growth, just as the object of this work, to test it and to identify its nature. To this end, our review littérautre allowed us to distinguish between the works having been resorting to panel data. At this level the work of Lanza & Temple (2003) should be mentioned as one of the first to test the causality using panel data from 13 OECD countries over the period from 1977 to 1992 and taking as variables; tourist arrivals, total expenditure, prices and GDP stays. In 2006, Algieri (2006) revisited the work (Lanza, 2003) and presented new results more convincing and, by testing a sample of 25 countries between 1990 and 2003 and proving the existence of a unidirectional causal link between the variables allocated to tourism revenue, the price index, the cost of transport and GDP. The author was able to prove that a 1% increase in GDP would lead to an increase of 5.8% in tourism revenue, which is considered a major impact.

In 2008, Sequeira & Nunes were based on 2 estimators namely the GMM and the LSDV to observe the same phenomenon. Their study sample is quite large, containing 94 countries, which was divided into two, depending on the degree of specialization of countries in tourism over the period 1980 -. 2002 the related results led the authors to conclude that the country size is not a factor reflecting the economic growth outcoming from the specialisation degree of tourism. Growth is the only promoted by the specialisisation the country, regardless of its size. We should therefore focus on the determinants of tourism growth with particular attention to the calculation of the productivity achieved by hotels, as a 1% increase in tourism revenue to GDP leads to an increase of 0.05 % of production. During the same year, and due to high heterogeneity between the subject countries, Fayissa & Nsiah & Tadasse (2008) studied the impact of tourism growth for 42 countries in sub-Saharian Africa from 1995 to 2004. They took as variables GDP, tourism receipts, human capital, investment and foreign



investment, the exchange rate and the number of arrivals. Using the autocorrelation model, they came to the result that a 10% increase in tourism revenue leads to an increase of 0.4% GDP / capita. Interested in the internal or domestic tourism more than international tourism, Cortéz.Jiménez (2010) studied the impact of this sector on economic growth in some regions of Spain and Italy from 1990 to 2004. He then divided his samples to internal, coastal and along the mediterranean areas. The results reveal that for the last two regions, tourism both internationally and nationally proves to be fruitful and considrebly affects the economic growth. Whereas it is less affected when it comes to internal regions. That is to say that the location is a key factor in this area.

In (2011), Nissan et al, have also focused on the examination of fallout of domestic tourism by investigating in Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, the Sweden, the United Kingdom and the United States. They have introduced as variables: tourist spending, human capital, public and private investment, business (participatory) and money supply mind. The results show that the importance of this sector, as measured by the cost of tourism in the country, affecting direct and significant economic growth. As a result, income levels are positively related to tourism development but it must be mentioned thatan expansive monetary policy would lead to probably higher prices. Other studies have also attracted attention as one of Dritsakis (2012), investigating on 7 mediteranian countries for the period 1980 to 2007, choosing for variables GDP, tourism receipts, the exchange rate and arrivals, he was able to affirm the impact caused by tourism on the economic growth of the concerned countries. Caglayan et al (2012) have demonstrated the existence of a unidirectional causality relationship between GDP growth and tourism receipts and this is for some countries of Europe, America, Latin America and Caribbean countries over the period from 1995 to 2008. However, the causal relationship takes a contrary direction when it comes to certain countries in South East Asia and Oceania.

In this case we are limited to the study of the impact of tourism on economic growth of a single country; Tunisia over the period from 1965 to 2012. So we used the method of time series for the study of the phenomenon. It turns out that this method attracted the attention of a greater number of researchers than the previous method. The number of studies reached 42 according Maria.DP.Pablo.Romero & Molina (2013). It requires less complexity for the collection and the processing of econometric data. At this level we are going to review some of such important studies examining the test of causality between tourism and economic growth, starting with that of Ghali (1976) who have resorted to the OLS in order to prove that the level of income falls about 17% in the absence of tourism growth in Hawaii over the period 1953 -. 1970 However, the first study of time series analysis was adopted by Balaguer & Cantavella.Jorda (2002) in the spanish context over the period 1975 - 1997 the authors introduced three variables under study; GDP, tourism receipts and foreign exchange rates. They thus demonstrated the existence of a causal way and a cointegrating relationship between tourism and economic growth. The same assumption was checked in (2004) Dritsakis, applying the Granger causality test. the author has found bidirectional causality between the idea of an international tourism in Greece and the country's economic growth over the period 1960 -. 2000 Thus, the revenue from tourism and the exchange rate have causal relationship with the economic growth, however, the latter and the exchange rate affect the revenue in a simple and direct way. Like him Demiroz & Ongan (2005) and Gunduz & Hatemi (2005) tested the same hypothesis, but they have achieved different results. The first duo investigating in Turkish context over the period 1980 - 2004 and following the same methodology as Dritsakis (2004) found a bidirectional causal relationship between the two variables. Whereas Gunduz & Hatemi who opted for Levier's causal test and not Granger's testified the existence of a unidirectional relationship measured according to tourist arrivals instead of revenue / economic growth over the period 1963 - 2002. Louca



(2006) was interested in the tourism sector in Cyprus during the period 1975 -. 2001 He tested the relationship between tourism revenues over 3 types expenditures of the supply associated with it. The results show the existence of a positive relationship (income / expenditure on advertising and promotions) and between (tourist arrivals / hotel expenses and food). The author argues that the policy of "expenses" directly affects the hospitality industry and this has a positive effect on the "income". Also taking Cyprus as an example, Katircioglu (2007) tested the relationship between tourism, international trade and economic growth using time series from 1960 to 2005. The author makes use of an autoregressive cointegration test (ARDL) and the results say that the economic growth of the island affects the development of international tourist arrivals and trade. He also emphasized the fact that the growth of imports / exports is positively associated with the number of international tourist arrivals. In the same context, Nowak et al (2007) who considered that tourism revenues could encourage imports, which undoubtedly strengthen economic growth, have tested the relationship between these three variables in the Spanish context during the period 1960 -2003 based on the Granger causality test. Their results show the presence of a unidirectional causality between income, imports of goods and services and thus economic growth.

In 2008, Taiwan and Turkey has been the subject of several studies, starting with that of Lee & Chien (2008) who analyzed the nature of the relationship GDP / tourism (revenue and arrivals) / rate real change in Taiwan between 1959 and 2003. Following the technique of Granger causality test, the authors highlight the existence of a bidirectional causal relationship between tourism and economic growth. However, they mention that the stability of this relationship there is intimately linked to political changes attributed to exogenous variables and economic crises that may arise. Regarding the Turkish case, Kaplan & Celik (2008) following the same methodology as the previous studies have identified a unidirectional relationship between tourism and GDP over the period 1963 -. 2006 What makes this area a fundamental pillar in the economy of country? That is to say that operating in the same period and studying the same sample, Maria Del P et al (2013) state that Katircioglu (2009) identifies a different result, namely; the absence of any causal relationship between tourism and economic growth in Turkey. This contradiction of facts is due to the use of a different methodology and different estimation methods to those attributed to the previous study.

It is now up to the American context, mentioning a study by Tang & Jang (2009) for the period 1981 -. 2005 They analyzed the relationship between 4 tourist industries (airlines, accomodation, hotels and restaurants) and GDP. They attested the presence of a unidirectional causal relationship between GDP and tourism in the USA. But the impact is relatively low compared to other countries where tourism is central to the national economy.

Many other studies have followed all treated with the same phenomenon, diversifying their pallets variable and in some cases, econometric methods. We cite the case of Jordan at the level of the Kreishan's investigation (2010) 1970-2009 by proving the existence of a unidirectional causality between GDP, touristic revenues and the actual exchange rate. Like them, and using the same variables, the same methodology and therefore the persistence of the same causation, Mishra and al (2010) have operated in the Indian context over the period 1978-2009. In the same context, an assumption widely verified in the Colombian environment, in light of the results provided by Brida & Risso (2010) during the period 1990-2006. This is followed by the case of Turkey, which has been discussed repeatedly since the Mediterranean countries excelled in tourism. Arslanturk and al (2011) tested the causal relationship between GDP, tourism receipts and exchange rates using two different methodologies. They introduced and other variables related to policy and institutional changes as factors influencing tourism / economic growth relationship. Their results deny the existence of any link between the series of variable and GDP is in no way linked to tourism



growth. Survey taken shortly after, Husein & Kara (2011) relied on the error correction model and confirmed the existence of a causal link between tourism receipts and GDP over the period 1964-2006. During the years 2012 and 2013 studies addressing this issue have continued to multiply; Amaghionyeodiwe (2012) who dealt with the case of Jamaica over the period 1970-2005. Obadiah & al (2012) for Kenya over the period 1999-2012. Tang & Abosedra (2013) for Lebanon in 1995-2010. And finally, Massida & Mattana (2013) for Italy over the period 1987-2009. Our study is therefore in line with all the work mentioned above, operating in Tunisian hotel industry.

Method

Variables

The objective of this research is to investigate the relationship between tourism and economic growth in the case of the Tunisian economy. Thus, we took the variable Tourist Receipts (RT) as an indicator of the tourism sector in Tunisia, and the variable (GDP / capita) as an indicator of economic growth in this country.

For econometric reasons, we have transformed our two variables in natural algorithm.

Stationarity Test

According to the test of stationarity LBIPT and LRT with constant, we note that these two variables are stationary in levels.

The same test but with a stationarity trend, we also provide the same results.

Thus, we can say that LPIBT and LRT are integrated of order 1.

Cointegration Test

To see if there is indeed a long-term relationship between LPIBT and LRT, we used the trace test and LR.

We have thus reached the existence of a long-term relationship between these two variables is:

LPIBT = 0.828 LRT + 1.794

Findings

Causality Test

According to the Granger causality test, we concluded that there is a causal relationship between tourism receipts and GDP per capita in Tunisia.

The same test also shows that it is tourism receipts (LRT) that cause GDP per capita (LPIBT) and not otherwise.

It is thus a unidirectional causal relationship



Pairwise Granger Causality Tests		
Date: 01/30/14 Time: 13:42		
Sample: 1965 2012		
Lags: 2		
Null Hypothesis:	Obs F-Statistic	<u>Prob.</u>
LRT does not Granger Cause LPIBT	<u>46 0.81230</u>	<u>0.4508</u>
LPIBT does not Granger Cause LRT	<u>22.0890</u>	<u>3.E-07</u>

Figure 1 - Granger Causality Test

Discussion

Through this paper we wanted to highlight the importance of the Tunisian hotel sector and that it greatly affects the national economy, while it is still regarded as an accessory with a good portion of our senior management. According to the results obtained, it has indeed proved the existence of a positive unidirectional causality between tourism receipts in Tunisia and GDP / capita over the period 1965-2012. It acts directly and indirectly on the economy, but also it promotes job creation, even if it is low-skilled and strong seasonal trend, there is still a way to fight against poverty in certain economically depressed areas. As a result, this sector has experienced significant changes over the entire study period, which explains the variation of its impact on economic policies.

During the period 1956 - 1961, the primary objective was to free the country of Tunisia of the French influence, and that, at all levels. Starting with agriculture. The interest for the tourism sector has been shown later, although the country has lean sources of foreign exchange earnings to finance the economic development of the country, Tunisian authorities quickly considred the benefits they could gain from tourism development. To achieve this development, the State has assumed the major tourism investments in the first years of independence of Tunisia. During the period 1962 - 1969, Tunisia has opted for a strategy of continuity of tourism seeking to attract more tourists. During the period 1970 - 1980, the tourism sector had targeted the European middle class families. To do this, several hotels of two and three stars have emerged to accommodate this new wave of tourists. This strategy was of a great success which led the hotelkeepers to develop another segment; business tourism. During the years 1981 -1986, following a severe economic and financial crisis (falling oil revenues, droughts), the tourism industry has become the leading sector of the Tunisian economy. In fact, Tunisia has experienced a net growth in tourism, and has developed a program to prepare the necessary infrastructure to accommodate several million tourists. During the years 1987 - 1995, a period characterized by the disengagement of the state towards the tourism sector on the benefit of private investors, encouraging internationalization. Following the Gulf War (1991) many accommodations have experienced problems related to debts, which led them to revise their prices downwards. A Period characterized by a general imbalance due to an overvaluation of the dinar and a large trade deficit, Tunisia has made reforms, thus following the advice of the IMF and the World Bank.

An adjustment program has emerged, affecting all sectors and calls for market deregulation, a tight fiscal policy and in particular the devaluation of the dinar. Since 1995, the Tunisian tourism chained success after success, Tunisia has strengthened its liberal economic orientation with its access to the World Trade Organization (WTO) and the signing of free trade agreements with the European Union (17.07.1995). In terms of the tourism industry, it has adopted a new strategy to deal with the problems arising from previous decades, namely an image of seaside mass destination, economic hardship for Tunisian tourism actors. At this level, we can say that the Tunisian tourism since independence until recently has undergone three major phases: takeoff (1957 - 1972); the boom (1972-2000) and the crisis (2000present). Despite the importance of this sector in the economy, several problems overwhelm and are becoming more numerous. Problems related to strategic issues, problems related to training even for hotelkeepers and officials. From 2002, the Tunisian tourism industry has intensively suffered from the impact of the very troubled international situation, which resulted in attacks of 11 September 2001 in the USA. Striking the Tunisian soil, bombing in April 2002 in Djerba has only complicated an already difficult situation. Consequently tourist arrivals fell by 6% in 2002, 17% of nights and foreign exchange earnings by 13%. Adding to this the problem of faltering demand and undiversified product. The Tunisian tourist offer was in the 60s based on seaside tourism. Today 81% of the total number of beds is located on the coastal areas. This causes a decline in occupancy of Tunisian hotels rates, itself linked to the low diversity of the Tunisian tourist offer and the predominance of seaside tourism. This would reflect the obvious decrease of the basic touristic product tourism product of the Tunisian tourism constituted by midrange seaside stays. Beside, tourists having opted for the Tunisian destination spend little. In 2001 a tourist spent, excluding transport, averaged \$ 304 in Tunisia against \$ 633 in Spain and \$ 750 in Turkey. An outdated image sold at a discount: the overall image of tourism in Tunisia, built by these institutions remains banal and poorly differentiated. Another significant fact characterises the Tunisian hospitality of being fragile and delicate. Given the boom has known this area in the space of 40 years; we see that the revenue per bed increases slowly compared to the changes in average costs per bed. This creates a huge imbalance, leading to the progressive collapse of the hotel unit, adding to that the phenomena of overinvestment and especially the increase in interest rates that are compounded by the lack of economic performance. The advantages of the Tunisian tourism are many (geographical position, mild climate, sandy beaches, oasis ...) however, the competition is getting tougher and tougher when it comes to French tourism, Spanish, Italian, and Moroccan or even Egyptian ... These countries record higher levels of growth compared to that of Tunisia tourism development. They also have extremely diverse offers and enjoy an appreciated domestic tourism. Several benchmarks allow the tourist to prefer one destination over another (the cost of supply, the type of product, reputation in the field, national or cultural events ...) The strategy adopted by these four countries had to aim to tailor their offerings to the new conditions of international tourism, while avoiding the pitfalls of tourism summer mass that some of them had already experienced (dependence on tour operators, seasonal, single-product, ...). Tunisia as for it rose less than its competitors; it did not take the turn that was presented to it, while the elites knew how it functions. From an Urbanistic point of view, according to ONTT, hotel infrastructure suffers from serious problems, it is estimated that 50% of hotels are completely obsolete, and 25% need urgent rehabilitation. This implies that 75% of Tunisian hotel parks respond timidly to safety standards required by public safety. Aside from a deserted hinterland, a blatant opacity characterizing the management modes, the problems affecting this sector continue to grow.



Conclusion

A major challenge: a total and absolute turnover of the structures of Tunisian tourism is more than necessary. First of all a restructuration of the supply and the demand must be handled. An anchoring in the national market should be followed, given the importance of domestic demand in that it reduces dependence towards foreign tourists and helps rebalance the balance of payments. We also note the existence of non-monetary impact, such as reducing social tensions and the strengthening of the citizen's sense. From the supply side, product diversification is more than vital. The development of areas in order to attract new investments in various products such as Saharan tourism, cultural, cruise, conventions, folk, and mainly in areas that are not always highlighted. Diversification directly affects the provision of accommodation, enrichment and a spectacular increase in range to meet these new requirements. Beyond the economic impact that this could have, segmentation and diversification of the tourism market it has competitiveness issues, in so far as an offer is distinguished it allows the country to differentiate itself from its competitors. But also a modernization of tourism institutions is recommended to have administrative and regulatory tools to govern the sector as a whole, obviously aside of the presence of a permanent, qualified, competent and innovative staff. Thus giving greater importance to a new strategic policy, encouraging hotelkeepers to adopt mergers / acquisitions, alliances and partnerships namely with developed countries to benefit from the achievements and strengths they have and to reproduce them within the Tunisian hotel industry.

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Managerial hubris detection: The case of Enron

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Abstract

Hubris is a known risk for leadership failure. We show that hubristic tendencies can be detected semantically ex-ante in textual reports, and offer a novel methodology aimed at detecting real-time hubristic propensities. The methodology employs text mining based on natural language processing (NLP) on Enron email corpus. NLP can capture information about employees and predict change patterns. Employing NLP real-time mechanism, Enron executives' hubristic tendencies were detected. Findings indicate that hubristic expressions amongst senior executives are significantly more frequent than amongst their non-senior counterparts, and that the frequency of hubristic expressions increases the closer one gets to Enron's collapse. Whilst both Enron's CEO's were hubristic, we found Skilling to be typified with severer hubris. Our study is the first to employ NLP real-time analytical process to detect the hubris disposition. Predicated on Enron's case study, we demonstrate the methodology's strengths, notably immediate recognition of accumulated symptoms and prevalence.

Keywords: hubris, leadership, Enron, natural language processing, risk

Introduction

Hubris is an exaggerated pride or self-confidence, often resulting in retribution, and unbridled leadership, hence it constitutes a tangible corporate risk factor (Brennan & Conroy, 2013). Hubristic CEOs engage in excessive risk-taking, biased reporting (Zeidan & Müllner, 2015), and overestimate their ability to succeed (Hayward & Hambrick, 1997). Throughout history hubris has been regarded a common reason for leadership failure, and the cause of colossal business failures. including the Farrow Bank 1920 collapse, the Bricklin Project, an archetypal case of entrepreneurial hubris, and the Enron downfall, attributed to hubris-related fraud (Palus, Bródka, & Kazienko, 2011). History repeats itself despite the cataclysmic effects of managerial hubris associated with the 2008 global financial crisis. Studies on hubris offer guidelines aimed at detecting and preventing this syndrome (Kerfoot, 2010) though organisations rarely address its causes. Our methodology detects real-time hubristic tendencies. Specifically, we argue that hubristic tendencies can be detected semantically exante in textual reports. Detection may be undertaken in real-time based on emails. We make several contributions. First, we extend the semantic detection of Top Management Team's



(TMT)'s hubris in textual context. Prior research on hubris examined transcribed samples produced by specific leaders, alleged as meeting hubris criteria (*cf.* Garrard et al., 2014). However, these studies fall short of validating findings by examining if the same hubris cues are used to identify it in different contents, or how hubris cues may be employed in other contents to generalise study findings. We present a case study based on this methodology, and we employ it to recognise and accumulate hubris cues. Second, we show TMT's hubris can be detected in real-time before leaders engage in hubris-related inappropriate actions (Hollow, 2014), with high impact on the risk management practice (Zhang, Luan, Shao, & Xu, 2016). We employ NLP real-time procedure to expose and characterise top executives' hubristic predispositions. Predicated on the Enron email corpus we evaluate whether hubristic dispositional symptoms typify seniors and non-senior managers We also endeavour to detect hubristic tendencies longitudinally in order to explore whether they evolve and worsen overtime, commensurate with firms' gradual demise.

Theory

Hubris

The concept of hubris emanates from Greek mythology to illustrate "hamartia", or imperfections typifying sovereigns or conquerors in Greek tragedies (Antonacopoulou & Sheaffer, 2014), Essentially, hubris is a cognitive bias that often affects managerial choices (Li & Tang, 2010), hence it epitomises overconfidence and haughtiness that thwart comprehension or acceptance of human bounds (Petit & Bollaert, 2012), specifically ovverestimation of leaders' endowments and capabilities (Hayward, 2007). Bias breeds a delusion of control, fanciful anticipations and unfounded optimism (Fabre & François-Heude, 2009). Hiller and Hambrick (2005), contend that hubris lies at the intersection of social comparison and self-serving bias, and that conceptually it overlaps with such social constructs as hyper-core self-evaluation (Cheung, Wu, & Tao, 2016), brazenness (Hayward, Rindova, & Pollock, 2004), and other counterproductive behavioural digressions. In Greek mythology hubris is punished by Nemesis (the spirit of divine vengeance) (Onayemi, 2008). Similarly, business performance typically penalises managerial overconfidence (Anderson, Ames, & Gosling, 2008), because it instigates predisposition to endeavour risky strategies that typically precede cataclysmic consequences. Hubris is considered a vocational hazard for leaders in every domain. Hubris Syndrome - conceivably an acquired personality disorder (Owen & Davidson, 2009), evolves when individuals assume positions of considerable power. Hubris has been typified as exaggerated self-belief (Brennan & Conroy, 2013), disdain of peers' advice and critique, and disproportionate self-confidence. Hubris is related to a lack of humility (Chang & Diddams, 2009) and engenders a sense of being 'intoxicated by power' (Owen, 2006). The consequences of Hubris for military leaders including Napoleon, Saddam or Milosevic (Kroll et al., 2000), were profound and eventually self and nationally-destructive. Likewise, business leaders' hubris results in such adverse corporate repercussions as loss of market share, diminishing strategic positioning and falling revenues (Haynes, Hitt, & Campbell, 2015).

Scholarly discourse and media reports associate Enron's TMT with severe hubristic behaviour. Boje, et al.(2003), referred to Enron's hubris-imbued corporate culture, where blatant evidences of TMT hubris were intertwined with the firm's ultimate collapse. The 'brutal competition' between two top executives' hubris ultimately wrecked Enron (Peraino, Murr, & Gesalman, 2002). Rapoport (2003) attributes Enron's collapse to 'humans and their hubris', whilst Chatterjee (2003: 145) suggests that Enron was a vivid instance of 'uncritical acceptance of accolade and narcissism'. Hubris then, is studied as self-deception or egocentric prejudice resulting in sub-conscious cognitive bias in corporate narratives (Merkl-Davies, Brennan, & McLeay, 2011). This aspect has heretofore attracted scant scholarly interest in the disclosure literature (Brennan & Merkl-Davies, 2013). This approach draws on



impression management that postulates managers' opportunistic exploitation of information asymmetries between them and organisational audiences, by means of biased reporting (Merkl-Davies & Brennan, 2007), associated with managerial hubris. Whereas impression management constitutes opportunistic managerial behaviour aimed at manipulating organisational audiences (Bozzolan, Cho, & Michelon, 2015), in terms of firms' perceptions of performance, hubris signifies self-deception or egocentric bias (Vance & Stuart, 2015), that results in managers' prejudice regarding their own performance. Goldman (2006) advocates 'toxin detectors' to expose highly 'toxic leaders' including leaders' narratives (Pelletier, 2010), in corporate reports that surface in e-mail messages (Kozinets et al. , 2010). Armenic and Craig (2006), advocate a thorough analysis of words used by CEOs, as they possess unsettling clues concerning CEOs' thinking and behaviour, often indicative of leadership dysfunction.

The Case Study: Enron

Enron Corporation was an American energy, commodities, and services company, based in Houston. Prior to its bankruptcy on 2 Dec. 2001, Enron workforce amounted to approximately 20,000 staff and had a globally diverse business industries, with quoted revenues of nearly \$111 billion during 2000 (Mergent Online), almost wholly predicated on its alleged trading revenues. Fortune named Enron 'America's most innovative company' for six consecutive years (BBC, 2006b), seventh largest in Fortune 500, valued at US\$70 Billion. Wide ranging external constituents hailed Enron as one of the most promising US companies (Gordon, 2002), specifically as a company endowed by an archetypal "innovativeness" (Bicksler, 2003). This "innovative" tag camouflaged disorganised, chaotic and excessively competitive intra-organisational corporate culture. Oddly, this exaltation persisted almost until Enron's bankruptcy. At the end of 2001, Enron's reported financial portfolio was institutionalised, sustained markedly by an systematic, and imaginatively schemed accounting fraud (Li, 2010), known since as the Enron scandal. Enron has since become a renowned instance of intentional corporate fraud and corruption. This also raised questions concerning accounting practices, followed by the Sarbanes-Oxley Act. This scandal affected global business by triggering the dissolution of the Arthur Andersen. Scholarly discourse (cf. Rapoport, 2003) and media coverage address every facet of this catastrophic business collapse. A variety of antecedents, mechanisms and aftermaths at diverse levels of analysis attempt to comprehend what happened at Enron, why and what are the fundamental business ethics and corporate governance consequences (Heath & Norman, 2004). Whilst individual-level antecedents include such factors as greed (Dugan, 2002), and trust (Hake, 2005), we specifically focus on hubristic leadership amongst Enron's top-level executives.

Skilling

Jeffery Skilling was nominated President and Chief Operating Officer in 1996, and CEO in February 2001. An example of Skilling's fraud intentions embedded in his 'creative accounting', were his letters to shareholders in which he stated Enron's record of \$1.3 billion in net income, whereas net income in audited reports was \$978 million (Brewer, 2007). With Enron's fall, Skilling did not abandon his trademark arrogance, and instead of declining to exercise the Fifth Amendment by remaining silent, he kept on lecturing, thus enraging legislators concerning the intricacies of accounting rules (Chaffin, 2004). *Lay*

Kenneth Lay was Enron's CEO and founder. Following Skilling resignation, Lay returned as CEO, promising that there were no "*accounting issues, trading issues, or reserve issues*" at Enron (Sims & Brinkmann, 2003). On Sept. 26, 2001, Lay was still confident about Enron's financial robustness, stating: "*the balance sheet is strong*", "*third quarter is looking great*," and "*Enron stock is an incredible bargain at current prices*" (Parloff, 2006). Lay



was vilified by federal prosecutors and the media as being the key executive in a massive fraud that destroyed jobs, savings, and shareholder wealth . Hubristic executives tend to fall into the trap of listening only to people whose opinions are compatible with their own, whilst discouraging open discourse (Kroll et al., 2000). Watkins, former VP for corporate development at Enron stated in an interview: "In the end, Enron is a story of failed leadership and even though Ken Lay likes to say that he was duped, he is the one who did not want to hear bad news, and in many ways, he enabled and nurtured the "dupers"" (Nance & Koerwer, 2004). A culture of arrogance and greed was evident at Enron's TMT (Rezaee, 2002). He used the company jet to ferry his daughter home from school in Europe Skilling was arrogant and publicly dismissive of critique. However, Lay is the one who built the company and thus was instrumental in inculcating and steering its poor ethical record and, essentially hubristic propensities.

Thematic Comparison of the Current Study with Brennan and Conroy's (2013)

Brennan and Conroy (2013) investigate letters to shareholders in annual reports by manually examining letters exchanged amongst shareholders over a decade. This procedure identifies phrases indicative of hubris. In what follows we compare between our study involving hubris detection's automated mechanisms and Brennan and Conroy's methodology. The comparison highlights advantages of real-time automated technique as opposed to manual procedures.

General

The automated redesign process is a useful alternative compared to the manual timeconsuming task (Krause, Marc-Andre, & Fridgen, 2013), essentially in terms of volume and time. Automation enables real-time responses to dynamic changes in such domains as trading (Davis, Kumiega, & Van Vliet, 2013), crisis management (Nathan & Kovoor-Misra, 2002), and service organisations (Madu, 1996). We argue that real-time and ex ante hubris detection are important for early exposure of the syndrome, prior to potential future damages. Additionally, NLP prevents investigators' bias, likely to transpire in qualitative research (Soltani, et al., 2014). Finally, we show NLP usefulness in analyzing e-mails in organisational settings.

Automation

Automatic identification and extraction of text-based opinions, emotions, and sentiments is an important technique for information analysts in governmental, commercial and political loci (Wiebe, Wilson, & Cardie, 2005). Likewise, sentiment analysis and opinion mining have been increasingly useful in interpreting metaphors, narratives, and viewpoints (Pang & Lee, 2008). Typically, automated content analysis explores texts tone by counting relative frequency of pre-specified key single words (Apel & Grimaldi, 2014), and is less prone to subjective judgment (Yu, 2015), less labour intensive (Lazar, Feng, & Hochheiser, 2010), and is easier to replicate (Arroniz, 2007). Automated content analysis facilitates the detection of patterns that could otherwise be likely missed (Apel & Grimaldi, 2014). Thus, information and cognitive science' computerised approaches are valid methods for simplifying text analyses (Indulska, Hovorka, & Recker, 2012).

Volume and Time

Studying, understanding and utilising documents' content require automated techniques designed to effectively extracting useful information (Rotella, Leuzzi, & Ferilli, 2015). Computational approaches' advantages refer to scalability, repeatability, and consistency, which facilitate markedly the analysis of voluminous data that pose substantial difficulties if analysed manually (Indulska et al., 2012), that is time consuming and more expensive (Li & Liu, 2014).



Real- time detection

For competitiveness companies must bridge across time and space concurrently in order to facilitate decision-making (Coleman & Ward, 1999). In post-modern information society, technology allows real-time monitoring of users' context (Baladrón et al., 2012). Increasingly, real-time technology is becoming important owing to growing dependence on instantaneous solutions (Malhotra, 2005). We offer a real-time detection mechanism for the hubris syndrome, thus facilitate immediate board action in following detection of hubristic tendencies. In contrast, Brennan and Conroy (2013)'s methodology is manual and involves post-ante content scanning as opposed to real time analysis, long after hubris has taken root, thus exacerbating potential corporate damage. Our methodology may be applied by organisations to detect hubristic tendencies automatically by observing changes or pronounced hubristic manifestations.

Ex-ante and post-ante detection

Preventing or reducing CEO's hubris constitutes a major organisational challenge (Petit & Bollaert, 2012). Hubris is difficult to diagnose, either in leaders or in ourselves (Lines, 1999). Moreover, as evidenced in the 2008 global financial crisis, consequences of leadership hubris are liable to spill over, thus entangle firms, industries and entire economies. Indeed, leaders' hubristic behaviour incur grave repercussions globally (Lawrence, Pazzaglia, & Sonpar, 2011). To prevent or tackle risky hubristic tendencies, it must first be detected. Indeed, critical to effective crisis management is detection of early warning signals (Sheaffer, Richardson, & Rosenblatt, 1998). Extant crisis literature shows that organisational early crisis detection strategies significantly improve crisis preparedness (Appelbaum et. al., 2012; Sheaffer & Brender-Ilan, 2014). Pertinently, early detection of fraud has been shown to be critical in federal agencies (Khanin & Mahto, 2012). We argue that hubristic tendencies may be detected semantically ex-ante in textual reports by way of exposingreal time formation of hubristic predispositions. This facilitates appropriate solutions to hubris before it turns organisationally destructive.

Bias analysis

Bias often typifies hypotheses or theory (Goode and Evans, 2007). It may be that findings are pointed to due to investigators' biases or observational habits (Cope, 2014). Else, investigators make systematic errors in data analysis which often yields significant findings only for them (Sawin, 2005). Aptly, Brennan and Conroy (2013), note that their study of CEO discourse is highly subjective and a second coder may arrive at different results. Hubris manual identification based on content analysis is liable to be innately subjective or biased since scientific objectivity cannot be applied to meaning-oriented content analysis in unmodified form (Merkl-Davies, Brennan, & Vourvachis, 2014). Thus, the need for reliable and scalable solutions in analysing messages calls for an automated-objective content analytical techniques (Scharkow, 2013).

Applicability

We employ an analytical technique based on keywords mined from an organisational email corpus. Keywords are based on Garrard, Rentoumi, Lambert and Owen (2014). The Enron email corpus, is regarded a valuable research database (Crabb, 2014). Prevalence of email enables the implementation of the proposed methodology aimed at detecting leaders' hubristic propensities. Brennan and Conroy (2013) investigate annual reports and letters to shareholders which are largely subjective and constitute a promotional text (Hyland, 1998). Thus, as opposed to objective content analysis involving routine word counting (Smith & Taffler, 2000), a subjective content analysis is liable to result in false conclusions. In their analysis of CEO's letters to petroleum industry shareholders, Prasad and Raza (2002) found



that these letters were aimed at generating a certain attitude towards OPEC amongst recipients, that deflected attention from the crisis of legitimacy faced by oil companies domestically (Prasad & Raza, 2002). Patelli and Pedrini (2015) analysed annual letters to shareholders and found specific language tones involving aggressive financial reporting to be positively associated with resolute, complex, and not engaging language. This suggests that annual reports may be written with similar style and thus identification of traits may occasionally be false.

Methodology

We employ text analysis procedures that include text mining, a variation of data mining (Raval, Suryawanshi, & Thakore, 2011), applicable for organisational research (Alvesson & Karreman, 2000). Increasingly, large amounts unstructured textual data defy simple attempts to make sense of it (Lee, Song, & Kim, 2010). Owing to increased number of such readily available electronic information as digital libraries, emails and blogs, text mining popularity grows (Irfan et al., 2015). Unlike data mining, text mining is predicated on such unstructured or semistructured text documents as web pages, newsgroup postings or corporate documents (Kin-Nam, Kam-Hon, & Ho, 2005). It involves computation of extracted meaningful information (Harpaz et al., 2014), aimed at gaining knowledge not explicitly stated in texts (Zweigenbaum, Demner-Fushman, Yu, & Cohen, 2007), and it enables a solution for specific information needs (Cohen & Hunter, 2013). The formation of new facts or hypotheses from extracted information may be further explored with other conventional means of experimentation (Dai, et al., 2010). This contrasts traditional information retrieval in which no genuinely new information is found and the information simply coexists with other valid pieces of information (Ojo & Adeyemo, 2013). Moreover, manual curation is time consuming, and does not scale with the growth of available literature (Winnenburg et al., 2008). Additionally, human text annotation is difficult for experts to agree on (Halevy, Norvig, & Pereira, 2009). Text mining is suitable for qualitative research since content with similar topics may have different wording (Scherf, Epple, & Werner, 2005), and although it involves word counting and seemingly a quantitative method, its data are still qualitative (Yu, Jannasch-Pennell, & DiGangi, 2011). This technique enables a high degree of consistency, most suitable for qualitative research, and has been frequently used in social media (Saif et. al., 2016). To meet challenges of unstructured text, text mining employs wide ranging techniques associated with natural language processing (NLP). NLP is a computational analysis approach involving human language text classification (Al-Alwani, 2015). In NLP, the most common method for text analysis is 'Bag-of-Words' (BOW) (Razavi et al., 2014), an illustrious knowledge structure based approach (Thorleuchter & Poel, 2016), in which documents are represented as a collection of words, regardless of grammar and word order (Cheng et. al., 2010), and classification is based on presence or absence of the predefined set of words (or terms) (Altinçay & Erenel, 2014). This simple representation has proved successful in text classification tasks (Wallace, 2015), and is recently dominating NLP research. The most basic, binary feature of this method specifies if a word appears within a specific content (bag) (Wu et al., 2014). We employ this technique on email corpus with arbitrary messages that require text mining (van der Aalst & Nikolov, 2008), with the benefit of analysing email communications designed to capturing information about employees and prediction of change patterns (Grobelnik, Mladenic, & Fortuna, 2009).

In May 2002, the Federal Energy Regulatory Commission (FERC) publicly released Enron's corpus of emails. FERC employs this procedure in order to improve public understanding of reasons underlying the investigation of Enron. We employ Enron corpus, known as a reliable source of data for research as it contains relatively recent conversational language (Lindsey et al. 2007). This dataset has been used extensively for research including data mining, text analysis, and NLP (Wilson & Banzhaf, 2009). The sheer volume of email traffic makes email



communication a suitable archive of organisational knowledge evolution (Storga, Mostashari, & Stankovic, 2013). Such large corpora yield good results in text mining (Cohen, Elhadad, & Elhadad, 2013). Akin with studies that used Enron corpus (cf. Eckhaus, 2016), we employ a Structured Query Language (SQL)-based processed database of Enron corpus (Shetty & Adibi, 2004). This procedure removed duplicate emails, computer generated folders, junk data, invalid email addresses and blank messages, and imports all email messages into a relational database. It enables query analysis using SQL, a relational database language that takes advantage of data's regular structure stored in tables (Özcan et al., 2006). In SQL the result of the queries is data extracted which are then analysed statistically.

The personnel occupation status of a subset of Enron employees was classified into four occupational categories: senior managers, middle managers, traders, and employees. Since senior managers are more hubris prone (Lawrence et al., 2011), we generated two distinctive subsets; senior executives and all the rest. Next, we counted the number of hubris distinct expressions for each email sent. For hubris expressions we followed Garrard et al.s'(2014) study who examined transcribed spoken discourse samples of two British Prime Ministers (Thatcher and Blair), who met hubris criteria, with detailed hubris tendencies during incumbency. For instance, "Soon after winning a second term as Prime Minister in 2001, Blair continued to display signs of HS when he introduced into his Downing Street office a new administrative structure under which decision-making on foreign affairs and defence strategy were effectively transferred from their respective Government departments". It was found (ibid) that the first person pronounced 'I' and 'me' and 'sure' which were amongst the strongest positive temporal correlates in Blair's speeches, and that the keyness ratio of 'we' featured prominently in the case of Blair. We therefore applied Garrard et al.'s list of words used by Blair as a measure for hubris (Appendix 1). An important leadership attribute applies to speaking and writing qualities. Business leaders (Greatbatch & Clark, 2005), juggle diverse stakeholder groups, each with its preferred language and interests (Simons, 2002). This because politicians and business leaders are prone to hubris (Owen, 2007). Hence, hubris keywords typifying politicians, also mirror business leaders' speech and writing style.

Findings

Senior management set includes 39 of 149 employees for whom job status was defined. The set includes 25,292 emails sent by these seniors, and 61,351 emails sent by nonseniors, from a total of 252,693 emails left following 'cleansing' the entire Enron set. In order to ascertain that hubris is more prevalent amongst TMT members, we ran t-tests to compare the number of hubristic expressions between the two subsets of employees (Table I). Results indicate a statistically significant difference between seniors and non-seniors (t = -12.4; df =46179; p < 0.001), indicating that hubristic expressions amongst senior executives are significantly more frequent.

Insert Table I about here

The tendency to speak in third person or use the Royal 'we', would predict that the frequency of the first person plural pronouns ('we', 'us' and 'our') will be high, in hubristic subjects' (Owen & Davidson, 2009). We applied this technique and counted the number of appearances of plural occurrences ('we', 'us' and 'our'). Then, t-test was used to compare seniors vs. non-seniors in the use of plural. Results indicate (Table II) a statistically significant difference between the subsets in the use of plural expressions (t = -26.28; df =44207; p<0.001). Seniors' plural expressions is significantly higher.



Insert Table II about here

Chatterjee and Hambrick (2007) note that the CEO's use first-person singular pronouns ('I', 'me' and 'my') is also indicative of narcissistic tendencies, thus may lead to hubris. Consequently, , we ran a *t*-test that shows a significant difference between seniors and non-seniors in the use of singular expressions (t= -13.86; df = 47788; p<.001), demonstrating that seniors' singular expressions are significantly more frequent than non-seniors'. This finding was expected since the words 'I' and 'Me' appear in the list of hubristic words used earlier, and it corroborates our findings. Meaning, in both cases, singular and plural expressions, are used more often by seniors. In order to substantiate that the difference between seniors and non-seniors in the use of both plural and singular forms exists without mutual influence, we performed a univariate analysis where singular expressions are used as co-variant, when examining plural expressions (seniors vs. non-seniors). The univariate analysis (Table III) shows the use of plural expressions are used as co-variant, we still identify statistical significance in the use of plural expressions. Specifically, seniors use plural expressions more frequently than non-seniors.

Insert Table III about here

Finally, the manifestation of hubristic tendencies overtime is displayed. Senior executives' hubristic expressions for each day in the database (4 May 1999 to 25 March 2002).

Insert Figure I about here

insert i igure i about here

Fig I. shows that the frequency of hubristic expressions increases the closer one gets to Enron's collapse. On 22 October 2001 the shares of Enron plunged after SEC announced it was investigating suspicious deals , characterising them as "*some of the most opaque transactions with insiders ever seen*" (Norris, 2001). Following the SEC announcement, an immediate decrease was recorded in Enron share price. On that specific day hubris expressions rose to the highest peak of 387.

Application of the Methodology: A Case Study

Next, we describe our methodology's usefulness. We suggest that it cannot only recognise and accumulate hubris cues, but it also measures the extent of its prevalence. For this purpose, we compare hubristic tendencies between the two Enron CEOs, (Lay and Skilling), and show who was more hubristic.

Case study analysis

We collected all emails in the database sent from Skilling (n=72) and Lay (n=35). Since the number of emails does not suffice to examine all hubristic expressions, we employ Owen's (2011) supposition that an effect of the hubris syndrome is the tendency to speak in the third person or use the royal 'we'. Hence, we counted plural occurrences ('we', 'us' and 'our') in both CEOs' emails.

Data were analysed using independent samples *t*-test to examine whose hubristic behaviour was more prevalent (Table IV).

Case study results



In order to ascertain that hubris cues are more prevalent in Lay's e-mails, we compared the two CEO's using *t*-test (Table IV). Results indicate a statistically significant difference between Skilling and Lay (t = -3.15; df = 105; p < 0.01).

Insert Table IV about here

Lay claimed he knew nothing about fraudulent actions, as Enron juror Baggett asked, "For a man that knew every aspect of that business and seemed to know every deal, why didn't he know what was going on?" (Ferrell & Ferrell, 2011). Oftentimes hubris arises from success; powerful people become self-absorbed, being overconfident they downplay other viewpoints because they endorse information filtering, commensurate with their success (Kerfoot, 2010). However, whilst both Lay and Skilling were hubristic, Skilling externalised it more than Lay (BBC, 2006a, 23 Oct.). Thus, an external observer would deduce that Skilling was more hubristic than Lay, who allegedly concealed its indications. The case study analysis accentuates our methodology's usefulness as it provides empirical evidence than merely recognising and accumulating hubristic cues. Our methodology also enables the measurement of the extent of this phenomenon's prevalence.

Discussion

Such cognitive biases as hubris (Li & Tang, 2010), incur potentially harmful consequences on corporate survival if afflicted leaders' behaviour is not being monitored, reported and addressed timely. Our study sheds light on the way such discourses as e-mail messages disclose purportedly detrimental hubristic symptoms. We offer a new framework for leadership hubris detection using a novel approach that utilises automated computerised techniques. No other published study has thus far employed NLP analytical process to detect hubris. Predicated on an archetypal case study we demonstrated the methodology's strengths, notably immediate recognition of accumulated symptoms and their prevalence. The study of hubristic leaders has recently gained substantial momentum, notably following the 2008 global financial crisis that exposed embedded corporate weaknesses, including narcissism and hubris (Patel & Cooper, 2014). Pertinently, these vulnerabilities often emanate from corporate leaders' hubristic propensities that engender biased, hence improbable perceptions that often delude them into underestimating risks whilst concurrently overrating their competences. Our ability to identify hubristic symptoms has improved dramatically, although documentation of hubris cues has been done invariably post-ante. A methodology is exemplified that enables ex-ante detection of hubris symptoms. Our contribution may be described along several parameters. First, automated or NLP procedure with which to detect hubris in voluminous email messaging. Second, our mechanism enables a real-time detection of hubris, which in-turn enables boards to effectuate their 'guarding dog' governance chore. Whilst evidently a delicate task, still tracking and identifying worrisome behavioural expressions may accurately, objectively and timely deter and attenuate leadership hubris. The mechanism we test enables real-time accumulative detection of hubris symptoms and compared to previous analyses is noticeably less time-consuming and may handle virtually limitless materials. Third, real time detection process allows hubristic tendencies to be noticed semantically ex-ante in textual messages. This is done by way of identifying real-time formation of a newly evolving hubristic predispositions as opposed to manual content analysis that pertains post-ante content scanning after hubris has taken root. Fourth, in lieu of undertaking manual and arduous content analysis we demonstrate an automated, reliable and scalable solution. This neutralises or precludes investigators' subjective interference. Fifth, we employed NLP on an organisational email corpus showing that it may be effectively implemented to detect personal syndromes.


Detecting early warning signals is of paramount importance irrespective of whether these indications pertain to organisation-wide weakness symptoms else worrisome indications of leadership behaviour. Some significant progress has been made in accentuating the pivotal role of early warning signals in the extant organisational crisis, finance and risk management literatures. This applies to the finance domain (cf. Bussiere & Fratzscher, 2006), notably the domain of (business) failure prevention (Li, Escalante, Epperson, & Gunter, 2012); risk management (Yang, Li, Ji, & Xu, 2001) and crisis management at large. That said, few have thus far investigated how top leaders' psychological state expressed by hubristic symptoms, enable perspicacious boards to identify looming problems. This task is necessarily ticklish since boards' overarching responsibilities do not involve in-depth analysis or evaluation of CEOs' mental or psychological disposition (Leary et al., 2013). This, despite the fact that in the end what drives leaders' behaviour at large and decision-making in particular is their personalities (Hannah at al., 2013). Pertinently, we showed how hubristic tendencies can be detected effectively in real time, thus enable boards to identify evolving leadership dysfunctionalities liable to result in cataclysmic financial repercussions. The 'what if question appears conspicuously relevant when asking what could be saved financially and otherwise if corporate boards were aware of the ability to identify executives' flagrant hubristic propensities prior to related corporate failure.

Limitations and Future Studies

Access the firms' intranet is a noticeable obstacle, particularly for scholarly research, therefore the likelihood of access to 'live' executives' electronic correspondence is avowedly limited. Hence, it seems highly implausible that firms would voluntarily enable investigators to access this means of correspondence. This, necessarily precludes NLP real-time analysis. This procedure, therefore is inevitably constrained to internal auditing and as such it constitutes a powerful governance apparatus with which to closely track top executives' personalities as reflected by their messages wording and content. A conspicuous limitation in this study is that it draws on a single corporation's e-mail corpus, thus precludes potentially useful comparisons. Moreover, NLP may be useful in identifying and interpreting additional psychological syndromes as well as overall leadership style. The study employs the Bag-of-Words Approach, which is a popular way of document representation. Future studies may extend this framework by employing other NLP techniques. Future investigators may extend the scope to a larger set of words. Our statistical analyses were evidently rudimentary, mirroring data constraints. Such additional analyses as Mancova may be employed in future studies contingent on the relative richness of the extracted data. Data on leadership style obtained through different wording identification (Salter et al., 2013), for instance may be conjoined with data from the same research population. This would enable a richer and more complex research model where leadership styles could be adjoined with leadership psychological dispositions.

Theoretical and practical implications

Leadership hubris has attracted scholarly interest for some 70 years, and the hubris phenomenon has been addressed extensively. Hubris has recently been addressed chiefly by students of ethics (McManus, 2016), economics and decision-making (Boumans, 2015), commensurate with such major occurrences in which leadership hubris surfaces, as global financial crises or wars. Recent theoretical implications span a variety of disciplines including psychiatry (paranoia), psychology (self-interest, self-assessment, self-aggrandizement, overconfidence and narcissism), business ethics, risk research, sociology (support of military options) and governance (social responsibility).

Our study points to several hands-on implications, not least of which is the detection of hubristic tendencies predicated on leaders' speech, writing and behavioural cues. Detection of

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hubristic predispositions may be applied by HRM tests involving selection and assessment of prospective managers. This enables a-priori classification of embedded hubristic propensities. The detection of hubristic dispositions may also be applied by board of directors one of whose tasks is to oversee top executives' conduct. Early detection of hubristic tendencies may constitute a useful governance mechanisms designed to focus on excessive leadership self-centeredness (Carmeli & Sheaffer, 2009), that often demarcate early warning signals.

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Appendix 1:

Garrard, Rentoumi, Lambert & Owen (2014)'s Tony Blair words				
1-grams*	2-grams*	3-grams*		
Engagements	Position exactly	Will have further		
Learned	Things about	I will have		
Condolences	Our human	House my hon		
ME	For allocation	And learned gentleman		
Killed	I will	My engagements I		
SURE	Get under	Hon and learned		
Ι	Can working	Right that is		
Listing	Rejoin the	Have further such		
Important	Let me	Condolences to the		
Antisocial	Of enforcing	Me in wishing		

* N-Gram is the sequence of n items.

Figures an	d Table	es			
Table I					
Comparing hubristic keywords: Seniors vs. non-seniors					
a	3.7	3.6		• • •	

Groups	Ν	Mean	Std. Deviation	t
Non-seniors	61351	1.43	1.27	-12.4***
Seniors	25292	1.55	1.29	
*** m < 001 N.	number of	amaila cam	4	

*** p < .001 N: number of emails sent

Table II:

The difference between seniors and non-seniors in the use of plural expressions

Groups	Ν	Mean	Std. Deviation	t
Non-seniors	61351	0.72	0.9	-26.28***
Seniors	25292	0.91	0.96	

***p<.001 N; number of emails sent

Table III

Univariate Analysis in which Singular Expressions ('I', 'me' and 'my') are Co-Variants

Groups	Ν	Mean	Std. Err.		
Non-seniors	61351	0.731	0.003***		
Seniors	25292	0.886	0.005		
*** <i>p</i> <.001' N; number of emails sent					

Table IV

Plural Expression Comparison ('we', 'us' and 'our') between Lay and Skilling

	Ν	Mean	Std. Deviation	t
Lay	35	1.54	0.741	-3.15**
Skilling	72	0.93	1.03	
	-			

** p < .01. N; number of emails sent





Fig I. Senior Management's Hubris Expressions overtime



CEO hubris: the impact of interpersonal effectiveness in the strategic decision making activity.

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Abstract

Does interpersonal effectiveness influence the likelihood of a CEO to be affected by hubris? The upper echelons theory has defined executive hubris as an exaggerated level of core self evaluation and has highlighted the consequences of different levels of core self evaluation on strategic decisions, but hasn't accomplished to systematically control the dynamics of core self evaluation to hubris. Following this stream of research, we attempt at investigating whether the trait of interpersonal effectiveness, widely studied in behavioural psychology, may help to prevent that high levels of core self evaluation may transit to executive hubris.

Keywords

hubris, interpersonal effectiveness, strategic decision making.

Conference Topic Organizational Behaviour

Introduction

One of the central debates in organizational theory and strategic management field has focused on the role of managerial decision making (Astley & Van de Ven, 1983) affecting company performances. On one hand, the population ecology and resource dependence perspectives hold that organizational outcomes are mostly determined by environmental and inertial factors, leaving almost no room for managerial action and decision making (Hannan & Freeman, 1977). On the other hand, the strategic choice perspective argues that managerial decision making plays a role in determining organizational outcomes (Child, 1972). Along this latter stream of research, a step ahead has been taken putting the attention on the role of CEO personality on managerial decision making. This circumstance has opened a huge stream of research involving other disciplines, such as psychology, which previously seemed a step away from strategic management research. This study aims at following this approach, since the upper echelons theory has demonstrated that CEO personality strongly influences a huge variety of variables, belonging to strategic decision, organizational processes as well as company performances. Furthermore, CEO personality may also negatively impact the strategic decision making process by affecting the CEO capability to take into consideration a huge amount of information coming from the environment, the top management team and the other company stakeholders. Core self evaluation is one of the most investigated construct regarding the role of CEO personality in the strategic decision making process. Nevertheless, an exaggerated level of core self evaluation - called hubris - encompasses negative implications for decision processes and organization. The objective of this study will be to investigate factors which may offset the potential transition of core self evaluation to hubris in order to prevent that a potential positive personality trait will shift to dangerous behaviors

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for the firm, since executive hubris could lead to bad or riskier performances for the company (Hiller & Hambrick, 2005).

Body of Paper

Along the strategic choice perspective, Hambrick & Mason (1984) have emphasized that Top Executives are usually assumed to greatly affect what takes place in their firms. Nevertheless, Papadakis, Lioukas & Chambers (1998) have highlighted that a set of factors influencing the strategic decision making process deals with the role of CEO Personality. Along this latter stream of research, the topic of executives' self-assessment has been investigated for a long time (for a review see Finkelstein & Hambrick, 1996): executives who are confident on their capability can benefit in seizing opportunities for their companies and take decisions that can reveal positive for company's growth and development (Keegan, 1987). Nevertheless, this stream of literature ends up with a series of cognitive factors that are likely to explain self-assessment: e.g. locus of control, narcissism, overconfidence, pride, achievement, just to give some examples. Such literature was in search of a rigorous and parsimonious construct that would explain individual choices better than the set of the above mentioned variables. Scholars have recognized core self evaluation as the possible overall construct (Judge et al., 2002) since it represents a unique *latent* psychological variable which causally influences a set of superficial qualitative traits: self confidence, self-worth, selfpotency and emotional stability (see Judge et al. 2002). Therefore, according to a consolidated literature (Bollen & Lennox, 1991), it seems parsimonious and statistically correct to directly analyze core self evaluation instead of the above mentioned traits whose joint analysis is statistically *redundant*, since they are all superficial indicators of a latent and deeper construct - i.e. core self evaluation (Judge, 2003). Core self evaluation describes "how individuals evaluate themselves, their abilities, and their relationship to the environment in which they operate" (for the validity of the construct see: Judge et al., 2002; Hiller & Hambrick, 2005). The rationale behind is that, ceteris paribus, an individual with a higher level of core self evaluation feels himself more secure as well as more able to see and seize opportunities for himself, to evaluate his tasks and working relations less stressful (Judge T. & Hurst C., 2006). In the current literature a number of studies have empirically linked core self evaluation to a variety of outcomes: job satisfaction (Judge & Bono 2001), job performance (Erez & Judge, 2001), motivation (Chen, Gully & Eden, 2004). Best et al. (2005) have investigated that the positive relation between core self evaluation and job satisfaction is mediated by the work environment. Hambrick (2007) has positively linked CEO core self evaluation to firm decisions and outcomes. Furthermore, high levels of core self evaluation positively influence the firm's entrepreneurial orientation and innovation attitude (Simsek, Heavey & Veiga, 2010). Thanks to their prominence in the organization, CEOs strongly affect the strategic decision making process (Simsek, Heavey & Veiga, 2010). CEOs with high levels of core self evaluation are more optimistic and prompt to change as well as to take strategic decisions which differ from previous ones (Hambrick, 2007).

Despite an high level of core self evaluation is considered a "characteristic of a normal human thought and healthy emotional functioning" (Taylor & Brown, 1988: 193), and is a common trait of CEOs personalities (see Hambrick, 2006), its extreme side - executive hubris - is generally defined as *a CEO's exaggerated self-confidence or pride* (Hayward & Hambrick, 1997; Hiller & Hambrick, 2005; Kahneman & Tversky, 1995), without the same positive recognition. Hubris is one of the most investigated topics in the "psychology of judgment" (DeBondt & Thaler, 1995: 389). It is considered an incorrect appraisal regarding one's own accomplishment which leads to taking credit for positive outcomes which are not causally linked with one's own actions (Lea & Webley, 1997). It is a cognitive bias that can



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influence decisions (Kahneman, Slovic, & Tversky, 1982), since it enables people to take decisions they would not have taken otherwise (Taylor & Brown, 1988). In details, prior researches have studied the impacts of CEO hubris on firm decisions and outcomes. The findings generally suggest that firms with executive hubris are prompt to pay higher premiums (Hayward & Hambrick, 1997), rely on internal rather than external financing (Malmendier & Tate, 2005), miss their own forecasts of earnings (Hribar & Yang, 2006), and undertake more value-destroying mergers (Malmendier & Tate, 2006) because they are confident about their capability to add value on the acquired company. In psychology, hubris is deemed "the dark side of pride" (Tracy & Robins, 2007a), since it is related to human arrogance, vanity, exaggerated self-appraisal and confidence. Hubris occurs when an individual's certainty about his or her own predictions exceeds the accuracy of those projections (Hilary & Menzly, 2006; Klayman, Soll, Gonzales - Vallerjo, & Barlas, 1999; Simon & Houghton, 2003) leaving the room for extreme performances: great successes and huge losses (Durand, 2003). In the managerial context, executive hubris leads CEOs to establish a dysfunctional relation with the external environment since Hiller & Hambrick state that hubris CEOs "are affected by strategic persistence" - which means the attitude to persist in a chosen decision despite the evidences of environmental changes. Audia et al. (2000) define this persistence *dysfunctional*. Furthermore, hubris leads to a misperception of high control which normally results in poor outcomes (Durand, 2003).

Therefore, this means that core self evaluation has a *dual* effect on company performances: under a certain level, its impact on company performances is positive and achievement oriented (Judge T. & Bono J., 2001); nevertheless, an excessive level of core self evaluation - or executive hubris - impacts strategic decisions (Bodolica & Spraggon, 2010) as well as company performance negatively, determining poor and riskier outcomes (see Hambrick 2005).

Crocker & Park (2004) have noticed that core self evaluation dynamics to executive hubris may happen since, in the long run, individuals with high levels of core self evaluation may lose relationships with other people because they are focused on themselves at the expense of others; they may also incur in higher risk of depression, since when they fail, this event may jeopardize their global sense of self worth (Crocker & Park, 2004).

Despite along the upper echelons theory many studies have demonstrated certain negative effects of executive hubris on strategic decisions and company performances, none has still investigated how to control core self evaluation transition to executive hubris, in order to prevent this dynamics neither to happen (individual level) or to produce effects (at a firm level) on strategic decisions. As far as this latter issue is concerned, many researchers have advocated a deeper investigation, since [...] "proper governance controls should be designed to prevent that negative consequences of executive hubris on the organization would occur" [...] (see Bodolica & Spraggon, 2010).

In order to fill the above citied literature gap, it seems appropriate to look for a personal trait – i.e. *interpersonal effectiveness* - that could prevent that high levels of core self evaluation may switch to hubris. This statement is a result of a managerial literature review which emphasizes the role of a latent variable – interpersonal effectiveness - so far inadequately taken into account by this stream of research despite urgently recommended by some scholars (see Hambrick, 2005). Hambrick noticed that executive core self evaluation [...] might be reflected in a wide array of executive behaviors and organizational attributes, *including interpersonal relations* [...]. Interpersonal effectiveness, defined as "the ability to deal with people" (Gabarro, 1990), has been mostly investigated by managerial literature in the last decades, since the interpersonal interactions and the nature of the interpersonal

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relationships between managers and peers "can determine their ability to get work accomplished" (Gabarro, 1990; Mintzberg, 1973; Sayles, 1979). Since the quality of strategic decisions also depends on the process that the CEO - Top Management Team undertake (Steiner, 1972: 35), interpersonal effectiveness can be considered the CEO personality trait which may prevent core self evaluation transition to hubris. Other scholars (Judge, 2002) have found out that high core self evaluation people benefit to get feedbacks and are more committed to targets designed as a result of the feedback process. This means that high core self evaluation individuals take advantage from feedbacks that differ from their own selfperception (Judge & Hurst, 2006) and this impact may be raised thanks to interpersonal effectiveness which increases the level of multi-source feedback at work (Bono and Colbert 2005). Interpersonal effectiveness is not an endogenous factor of the core self evaluation construct, since core self evaluation doesn't provide information on the CEO capability to interact with the external environment and the top management team (see Hambrick 2005). In psychology, the social evidence of high self esteem is called "authentic pride". It is a positive recognized emotion, which "leads to positive behavioral outcomes for both the self and the others in interpersonal contexts" (Tracy & Robins, 2007). Furthermore, authentic pride is defined the "more prosocial, achievement-oriented, and socially desirable facet of emotion" (see Amason & Schweiger, 1994). On the opposite side, hubris tends to invade others' needs, determining conflicts in the organization (Paulhus & Williams, 2002). In the long run, this phenomenon may lead to significant interpersonal problems (Paulhus & Williams, 2002).

All this premised, we can formulate the following proposition: INTERPERSONAL EFFECTIVENESS NEGATIVELY IMPACTS THE PROBABILITY THAT CORE SELF EVALUATION TRANSITS TO HUBRIS.

The main point beyond this proposition is that the higher is the level of interpersonal effectiveness, the lower is the probability that core self evaluation would evolve to hubris. Interpersonal effectiveness prevents CEOs to remain isolated from the external environment and increases the level of interactions between CEOs and their main collaborators. Nevertheless, the upper echelons theory has empirically demonstrated that teams that put in practice high levels of interaction, produce higher-quality decisions compared with teams that do not (Schweiger, Sandberg & Ragan, 1986; Schwenk, 1989). Nevertheless, the two main types of interactions of CEO – top management team during the strategic decision making process belong to cognitive and affective conflicts. The cognitive conflict is [...] the task oriented conflict, focused on judgmental differences about how best to achieve common objectives into the strategic decision making process between the CEO and the top management team [...] (Amason, 1996). The affective conflict is the complex of negative emotions of anger and frustration which may emerge in the CEO - top management team interaction during the strategic decision making process. A cognitive conflict increases the understanding of problems and scenarios and permits decision makers to cope with more information and to see and seize strategic alternatives on different perspectives. Interpersonal effectiveness impacts during the CEO – top management team interaction by positively enhancing the role of the cognitive conflict into the strategic decision making process. Furthermore interpersonal effectiveness may prevent that the cognitive conflict may shift into the affective conflict, thus offsetting the advantages of the interaction itself (Amason, 1996). Nevertheless, interpersonal effectiveness may positively affect the post-decision interactions, by increasing affective acceptance among top management team members regarding the quality of the decision taken and the validity of the interaction process taken.



Conclusion

In this study we have tried to explain which personal trait could prevent managerial negative attitudes in strategic decision making. The inability to test one's perceptions as well as the tendency to lose touch with reality, because one occupies a top position, is a danger anyone can fall victim to when in a leadership position (Kets de Vries, 1989). In particular, CEO's interpersonal effectiveness is associated with the likelihood of preventing the transition from an high level of core self evaluation to an hyper one – hubris. Despite core self evaluation is a CEO personality construct which positively influences a variety of organizational and economic factors, its hyper level - hubris - may negatively affect the strategic decision making process. Thus, generally speaking, hubris leads a CEO to overestimate the likelihood of the success of a strategic initiative, even though it is associated with great risk, and to underestimate the importance of data gathering in the course of the strategic decision making process.

We argue that CEOs with high levels of interpersonal effectiveness are more likely to maintain the good nature of core self evaluation and to take right strategic decisions.

Our theoretical contribution is to have found a variable that may prevent core self evaluation transition to hubris. This study could be an attempt to enrich strategic management research. It could advance research in better understanding the phenomenon of core self evaluation dynamics to hubris and to validate the application of interpersonal effectiveness in this setting. The potential usefulness of this finding deals with the detection of control systems to prevent that executive core self evaluation transition to hubris may impact strategic decisions and company entrepreneurial orientation (firm level). These systems may be designed by the Board of Directors, the top management team and other external stakeholders. Furthermore, despite human factors such as personality, cognition and emotional states have been strongly investigated by psychology, neuroscience as well as sociology researchers, they have been insufficiently treated by the current governance literature (Brundin and Nordqvist, 2008). Strongly influenced by the Agency Theory Paradigm, Corporate Governance literature has not given adequate attention to the role of behaviors and relationships among the actors involved in Corporate Governance dynamics. Since governance processes are a result of human decisions and interactions, the study of the impact of actors' affects, values, aspirations and emotions would be an important field for future research.



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Economic expertise and colonial economic policies in the British

West African dependencies

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Abstract:

Knowledge, science, inventions and production are undoubtedly driving forces for the expansion of the imperial enterprise and gradual appropriation of colonial resources and markets after subduing colonial peoples to imperial authority. The British Colonial Office had to reform its own organisation, create advisory bodies and seek advice from academic and professional expert institutions for such purpose. This marked some kind of departure from laissez-faire philosophy and adherence to the state intervention principle by which the Colonial Office officials managed to elaborate centrally-guided economic policies so as to almost fully integrate the colonial economies into the imperial production pattern. However Britain's economic difficulties affected the rate and progress of colonial development and prevented the growth of colonial balanced economies.

Keywords: expertise, colonial, economy, development, Colonial, Office **Conference Topic:** AC-EMM 2017

Introduction

The survival of human existence depends essentially on economic growth and development, the process of which has been for some groups dialectically partly associated with colonial expansion and imperial domination. The latter was not a pure coincidence during the Industrial Revolution; actually the 1884 Berlin Conference on the colonialist partition of Africa could be regarded as an instance of such relationship. Though African economic resources did not initially constitute the major sources of profits for British investors and governments, they became gradually the object of increasing managerial interest the importance of which could be seen in the reorganisation of metropolitan and peripheral official machinery, the setting up of research and training advisory institutions in response to successive predominant economic and political trends and requirements. The latter comprised the 1929 Colonial Development Fund, the Great Depression and subsequent protectionist policies, 1940 Colonial Development and Welfare policy, Second World War economic requirements, 1945 Colonial Development and Welfare policy as well as postwar economic crisis. The evolution of the British Colonial Office is well described in a number of books elaborated by former Colonial Office officials like C. Parkinson, C. Jeffries and others like J.M Lee whereas colonial economic policies have been examined by various historians, namely AG Hopkins, B. Niculescu, Gupta and others. The paper will attempt to examine the Colonial Office advisory expert institutions together with unofficial bodies concerned with economic expertise as well as the economic policies that were framed in response to the different contexts between 1920 and 1950 taking evidence from archival colonial papers.



The Colonial Office and expert advisory bodies

Exploration and management of the overseas areas was undertaken initially by mercantilist chartered companies under Tudor, Stuart and Hanoverian monarchs before their transfer to the Crown. Then, guidance for and control over the management of the colonies was entrusted to locally established colonial governments and to the Colonial Office at the metropolitan level. The latter which had been initially known as the Committee for Trade and Foreign Plantations from 1662 until 1801 when it was incorporated in the War Office, evolved into a Colonial Office and India Office in 1854 and was separated from a newly established Dominion Office in 1925. Both the India and Dominion Offices merged in 1947 to become the Commonwealth Relations Office.

The 1909 Colonial Office comprised six geographical departments concerned respectively with the Mediterranean, the East, Nigeria, West Africa, East Africa and the West Indies, together with a General Department to deal with accounts, printing and library work. After the First World War, besides the General Department, there were 2 extra geographical departments dealing with Africa. This geographic-based approach was later supported by subject-oriented departments, especially after the Great Depression, which was to pave the way for better expert advice on colonial matters. By 1940 there were 7 geographical departments and 9 subject specialized ones increasing respectively to 8 and 15 by 1946 (CO List).

As far as economic affairs were concerned, finance and economic matters were added to the General Department by 1931 and two years later a separate Economic Department was created evolving into a division under Sidney Caine in 1946 with four departments dealing with production under W.D.L. Monson; commercial relations and supplies under T.W. Davies; finance under J.B. Williams, and marketing under E. Melville. Undoubtedly, reforms at the central administrative level were accompanied by the reorganisation of the colonial service, and with regard to colonial economic affairs, a number of branches were set up successively: Agriculture (1935), Forestry (1935), Veterinary (1935), Customs (1938), Mines (1938), and Research (1949) (CO List 1950).

Besides its administrative official bodies, the Colonial Office created advisory committees which would advise the Secretary of State for the colonies on certain matters. With regard to economic questions and policies, there were 6 of such bodies before 1919: the Imperial Conferences starting from 1887, the Imperial Institute (1893), Colonial Survey and Geophysical Committee (1905), West African Currency Board (1912), Empire Resources Development Committee (1916), and Transport Imperial Shipping Committee (1918). The Interwar period saw the creation of 16 additional economic bodies under official responsibility: Colonial Research Committee (1919), East African Currency Board (1920), African Liquor Traffic Control (1924), East African Office (1925), Imperial Economic Committee (1925), Colonial Development Advisory Committee (1929), Imperial Communications Advisory Committee (1929), Colonial Advisory Council Agriculture Animal Health and Forestry (1929), Executive Council of Imperial Agricultural Bureaux (1929), Colonial Currency Committee (1930), Standing Financial Committee (1932), Colonial Forest Resources Development Department (1935), Empire Forestry Conference (1935), Standing Committee on Empire Forestry (1935), Committee on Nutrition in the Colonial Empire (1936), and the Colonial Empire Marketing Board (1937). During the 1940s, 10 councils and committees were established comprising: Colonial Products Research Council (1941), Colonial Research Committee (1942), Colonial Fisheries Advisory Committee (1943), Colonial Social Science Research Council (1944), Colonial Agricultural Animal Health Forestry Committee (1945), Colonial Economic Development Council (1946), Colonial Economic Research Committee (1947), Colonial Research Council (1948), Colonial



Development Corporation (1948), and the Overseas Food Corporation (1948), (CO List 1930-1950).

Parallel to the Colonial Office's gradual interest and involvement in the management of colonial economic resources, there were few other unofficial bodies that could provide expert knowledge: the School of Oriental and African Studies (1916), Imperial College of Tropical Agriculture (1921), Empire Cotton Growing Corporation (1921), and Imperial Forestry Institute- University of Oxford (1921). It should be noted that most advisory committees were financed from the Colonial Governments and not from the British Treasury (CO-CDAC 1940).

Expertise

The creation of such bodies was undoubtedly designed to meet the lack of local knowledge and background which Cosmo Parkinson, Under Secretary of State for the Colonies (1937-1940 and again until 1942) considered as "the most serious defect in the Colonial Office" (Parkinson, 1947). In fact, with the exception of very few official commissioners or others having served overseas, CO officials, having no experience in the colonies, had to turn to the Crown agents for the colonies and to officials from other government departments for some expert advice. Examination of the membership and workings of each of the bodies cited above is partly beyond the scope of this article, however reference can be made to some important ones. The Imperial College of Tropical Agriculture in Trinidad was set up to promote the study of tropical agriculture, and provide for the training of a body of expert agriculturalists, chemists and scientific advisers and researchers. As to the Imperial Forestry Institute at Oxford University, financed mainly by colonial governments, it aimed at training postgraduates, undertaking scientific studies of trees, and carrying out research on biological and economic problems bearing on forestry. Most of the committees comprised Colonial Office representatives and university experts. Reference can be made to a few of them like Frank Arthur Stockdale, a famous agriculturist and colonial development adviser; Sidney Caine, educated at the London School of Economics and former Financial Secretary of Hong Kong. University academics included to name just a few Professors like Noel Frederick hall, Oxford graduate and Professor of Political Economy at University College London; Arthur Lewis, Lionel Charles Robbins, Raymond Firth, Alexander Carr-Saunders, Arnold Plant and Ernest Cassel all of them from the London School of Economics; Frank Leonard Engledow, an agricultural botanist at Cambridge University. It should be underlined that those committees dealing with colonial economics had published a number of papers covering different areas of economic development (CO 990, 1943-46)

Economic policies in the interwar period

The growing importance of colonial affairs and the emergence of such bodies was partly linked to British officials' departure from the prevalent governmental philosophy of laissez-faire, and to postwar difficulties that pressed them to adhere gradually to state intervention doctrine or Keynesian principles with a view to profitably using colonial assets. Lord Milner, Secretary of State for War 1918-19, and for the Colonies 1919-1921, did not hesitate to stress that "the colonial assets should be taken over and exploited on a large scale by the British Government and the profits should be used to pay off Britain's debt." (Wilson Fox, 1918). Postwar growing interest in the exploitation of colonial resources found expression in the creation of a number of committees and imperial conferences listed above aiming at the desirability of 'imperial self sufficiency' within world trade. The 1925 Imperial Economic



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Committee and the subsequent 1926 Empire Marketing Board were entrusted with improving marketing methods of imperial food products within the UK and enquiry into the production of exporting raw materials of the Empire. But the British Treasury's strong opposition to commit money to develop colonial production and to depart from laissez faire economic policy forced Leo Amery, Colonial Secretary 1924-1929, to make concessions in his policy of colonial development fund by imposing interest charges on loans for colonial development projects, the latter being primarily designed to solve unemployment problems in Britain through orders for manufactured goods and engineering work. Actually, Conservative and Labour officials could not abandon profitable economic assets and imperial power in the name of ideals or unrealistic humanitarianism when such assets were very badly needed. The subsequent 1929 Colonial Development Fund voted by Parliament under Labour R. MacDonald government (1929-19231) provided for an expenditure of £1million per year for schemes most relevant to metropolitan interest: equipment for cultivation, drainage and irrigation, construction of railways and harbours, supply of electricity and exploitation of mineral resources. British economists like J. Atkinson Hobson and J. Maynard Keynes were advocates of state intervention and investment in some economic activities with a view to increasing consumption and consequently demand, which would in turn promote industrial production and secure employment (Hodgart, 1977). But spending from this 1929 Fund faced some difficulty because of the concomitant world financial crisis, which pressed British officials to review their imperial economic policies. The initial steps taken during the 1932 Imperial Economic Ottawa Conference could show a departure from a free trade doctrine to some kind of protectionism under which import duties were imposed on cheaper Japanese goods in British West Africa and favoured more highly priced British ones.

Out of the 1929 Fund the British Government could spend only £8.875,083 million until 1940, one fourth of which was allocated to the African dependencies, whose commodities could provide Britain with net dollar earnings at the rate of \$200m a year from hard currency markets. (Fabian Colonial Bureau,1949). British West Africa, for example, supplied the European markets with cocoa, rubber, groundnut, cotton, manganese, diamonds and gold, when the Gold Coast was the third largest producer in the world for diamond and manganese (Bourret, 1968). The export-oriented colonial economy was part of the imperial production pattern making colonies sources of suppliers of raw materials and consumers of metropolitan manufactured goods such as tobacco, spirits, cotton piece goods, matches etc preventing thus the progressive development of secondary industries. One may wonder how a colony that had, in British Officials' mind, to be financially self sufficient on one hand and to remain basically the importing market of more expensive and partly unnecessary metropolitan industrial products on the other, could accumulate capital for starting secondary industries while nearly half its revenues, as in the case of British West Africa, were allocated for the payment of salaries and pensions of expatriates (Hopkins, 1973).

Deficiency in colonial development together with other challenging international and colonial factors during the 1930s such as the emergence of Nazism and fascism, consolidation of communism and disturbances in the colonial empire pressed Colonial Office officials to put into question their misconception of colonial development and control. This misconception rested upon the belief that " it might "might take generations or even centuries for the peoples in some countries of the Colonial Empire to achieve self-government" as stated in the House of Commons by M. MacDonald, then Secretary of State (1938-1940), (HCD, 1938). This miscalculation, which relied upon the loyal collaboration of submissive illiterate chiefs under the framework of Indirect Rule, and the exclusion of politically-minded emerging educated elite from policy and decision-making machinery, was rejected by Pan Africanists and radical youth movements leaders. Such miscalculated belief prevented to a large extent the development of colonial higher education and consequently the production of



local experts. However, some officials were aware that such exclusion tended rather to antagonize educated Africans and threaten the stability of the colonial system. M. Hailey, Political Adviser at the Colonial Office, observed during his tour in the colonial African dependencies in 1940 that "racial consciousness took the form of standing antagonism to a government of alien composition, its leaders having usually been in the better educated and more socially advanced element in the native population" (Hailey, 1944). Given the very threat to British imperial survival in the late 1930s, the Colonial Office officials had to accept Hailey's concept of 'imperial or colonial partnership', under which colonial economic development was to constitute the preconditions to any form of political transfer of power. Already, Colonial office officials, motivated by forward thinking after the 1938 West Indies disturbances had been thinking of extending 1929 Fund into new economic and social policies.

The War, economic requirements, and post-war planning

The 1929 Colonial Development Fund was replaced by 1940 Colonial Development and Welfare Act, providing for assistance to colonial governments up to a maximum of £5 million a year for development and welfare work, and an annual sum for colonial research up to a maximum of £500,000. Defending this new policy in the House of Lords on July 5th 1940, Lord Lloyd, then Colonial Secretary (1940-1941), underlined the' reproaches directed by Britain's rivals as to the little development undertaken in her vast Empire (Cmd 6174).

Conceived as a precondition to training in management and eventual long-term transfer of power, the 1940 CD&W Act focused on the improvement of the economic and social conditions and on the amelioration of the means of their achievement, which would necessitate an increase in revenue through taxation, improvement of local government machinery, and reinforcement of personnel for various services. But its implementation proved difficult given the urgent wartime priorities imposing control of trade, mobilisation and diversion of funds and labour force. The June 1941 circular sent by Colonial Secretary, Lord Moyne (Feb.1941-Feb. 1942), stressed the need "to regulate the use of resources in the interest of both the general war effort and the well being and development of the colonial empire; to reduce consumption by taxation direct or indirect; to save actual material resources in personnel; to organize propaganda for various schemes; to encourage various gifts and free interest loans." (Cmd 6299). In fact, additional taxation amounting to 5% on all import duties, 50% duty on gold and export duty on cocoa and manganese were imposed in the Gold Coast colony as a contribution to the defence of the Empire. Colonial exports to the UK from Nigeria rose from 59.48% in 1939 to remain above 80% during the war period, those of Sierra Leone from 61.14% in 1939 to 82.87 in 1945, and from Gambia from 30.61% to 91.82% respectively. UK monopoly over the West African export market was obvious, for it could enable her to sell to hard currency zones and increase her dollar earnings. West African imports from the UK were above 50% for Nigeria during the war period, above 60% for Sierra Leone except in 1942 and 1944, above 45% for Gambia except in 1941 and 1943 increasing to above 55%, whereas in the Gold Coast, imports from the UK were above 60% for the war period. Economic help to the UK from June 1943 to the end of the war in raw materials was valued at £31,351,000, and about £22,556,000 were shipped from British colonies to the USA, enabling Great Britain to earn dollars (Colonial reports and CO96/765/31080/1940). British monopoly over West African trade can indicate a stronger integration in the imperial production pattern in which the West African colonial economies would remain subordinated to that of the UK, and their development would considerably depend on the productive and absorptive capacities of the British market in the difficult postwar years.



Besides this control, diversion of funds for the War constituted an impediment to colonial economic development; the colonial government of Sierra Leone offered a sum £756.000 over three years, that of the Gold Coast offered £6,972,731 in addition to private gifts amounting at least to £931,127 (Colonial Reports, 1946). As regards diversion of labour for a War, which was not the direct concern of colonial people in general and that of West Africans in particular, intensive recruitment raised the prewar level of the Royal West African Frontier Force from 8, 000 to 146, 000 (Cmd 7167). This diversion of resources consequently retarded the implementation of development policy during the war and even later. Examining the financial aspects of CD&W, Niculescu evaluates the total sum of money spent from CD&W at £2,860,000 for all the colonies, which is quite meaningless compared to what the latter offered during the War (Niculescu, 1958).

Though most of the resources whether human or material were badly needed for other purposes than the development of the colonial people, the war effort contributed directly or indirectly in the improvement of West African infrastructure and the creation of a regional administrative organization to discuss the possibilities of postwar reconstruction. The colonial governments were asked to formulate economic plans for years ahead with the assurance that some of the money would be available from CD&W sources. For this, Conservative Colonial Secretary Oliver Stanley (1942-45), had to persuade the Treasury that such assistance and investment would "would prove beneficial to Britain, and would in the long term benefit Britain, either in the form of increased export of colonial commodities, which otherwise Britain would have to obtain from hard currencies, or in the form of increased export from the colonies as part of the Sterling area to the hard currency country outside" (CO 852/588/19275/1944). In his opinion, the development cost of the colonies to the UK would be minimal because part of the money would be given in a loan form and would come back to the Treasury. There was however no indication that those loans would be interest-free whereas colonial loans to Britain were interest-free during the war. This approach to colonial development was rather determined by Britain's priorities in the postwar era, and one wonders whether there could have been any other alternative for the development of colonial people under colonial rule and domination and from a government motivated by short term and long term self interest and known for its imperialistic practices.

At the regional level, a development adviser, Noel Hall, former Director of the British National institute of Social Economic Research, was appointed in 1943 in order to advise on which schemes could be given priority as regards material requirements and also on schemes not covered by the assistance from C.D&W. He was concerned with the task to avoid overlapping of research and to advise on the provision of the technical assistance. The machinery established in West Africa resembled a pyramid the base of which was constituted by the district and Provincial Committees. At this level officials had to collect facts, figures and opinions on local development projects; at a second and higher level, the Central Committees in each colony received the data available, and formulated plans which were channeled up to the Development Adviser for examination. Approval and disapproval or amendment of development plans were to derive at a higher a level, the centre of decisionmaking, in which complementary arrangements were to be made in order to meet the new requirements of the colonies for their development programmes (CO 554/132/33718/1/1943). N. Hall's report pointed out to existing incomplete land surveys, unavailable hydraulic data, insufficient economic and demographic data. So, there was an urgent need for training local staff and secure the services of expatriates. Local training at higher level necessitated the development of higher education, which was the mission of the 1943 Asquith and Elliot Commissions respectively appointed to deal with colonial higher education in the colonies and in West Africa in particular (Borsali, 1983).

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Postwar economic policies

Given the importance of colonial assets for British postwar reconstruction, the Colonial Office managed to obtain an increase in CD&W financial provisions totaling £120 million over ten years starting from 1946 with maximum annual expenditure of £18.5 million including £1 million for research. The £120 million was distributed as follows: £ 23,500,000 for central schemes including research, £85,500,000 to be allocated to colonial territories and £11,000,000 as general reserve for supplementary allocation (CO 852/588/19275/1944). Elected in 1945 with absolute majority, the Attlee Labour Government with his successive colonial Secretaries, G. Hall and then A. Creech Jones were committed to implement already formulated CD&W policies without introducing immediately structural changes in the colonial production pattern. However, the economic side of the Colonial Office was strengthened, a Colonial Economic Development Council was set up in September 1946, the role of which was to advise on development projects including those undertaken by private enterprises, and on all investments leading to the UK assistance either in the form of finance or in the provision of supplies. This reorganisation was reinforced by two public corporations in 1948, the Colonial Development Corporation and Overseas Food corporation, constituting thus an attempt to combine the best features of private enterprise and public control. Despite all these efforts with a view to ensuring better metropolitan peripheral economic conditions, post-war financial difficulties appeared to determine the orientation and rate of colonial progress; the British government agreed on a US \$3.375m multi-tied loan, and one may wonder how Britain's dependence on foreign assistance would enable her to honour her commitments of colonial development as defined in the Act of 1940, 1941 Circular, and 1945 Act. Within this context it became obvious that some colonial development plans were then to be kept within the boundaries of the practicable and that the development of colonial primary products of all sorts constituted, as stated by J. Strachey "a matter of life and death of the economy of Britain" (Gupta, 1975). To save the declining empire and despite Colonial Officials' opposition, the British Treasury acted contrarily to the spirit of C.D.W, it exacted a sum of £100 million out of the £800 million, that is one eighth of the colonial sterling balances held in London regardless of the sacrifices and contributions made and offered in human beings, material and financial resources to Britain during the War. Sidney Caine of the Colonial Office argued that "it would be an act of bad faith to take away with one hand what we have given with the other" (T 236/ 51). Given such difficulties the Colonial Secretary, Creech Jones instructed the colonial governments to keep their demands on imports to very low levels from the British and Sterling areas, and still lower from hard currency zones. Consequently, it is not surprising to see that only £13.5 million from colonial development funds were spent during the first three and a half years while the annual limit for expenditure had been fixed at £18.5 million. These self-centred practices were against the spirit of colonial development and could but prevent the normal growth of balanced colonial economies.



Conclusion

Departure from laissez faire policy to the adoption of Keynesian principles or state intervention was characterized by dependence on expert knowledge offered by various committees and commissions whose membership comprised former colonial officials, politicians and university academics. However, it was not all the time possible to balance between what was morally desirable, scientifically necessary and politically and economically impracticable or unacceptable. Evidence shows the relatively unavoidable continuing process of colonial exploitation despite some British officials' and academic experts' higher standards of forward thinking.

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The Connection Between the Increase in Foreign Reserves Around The Globe and The U.S Collection of Seiniorage Revenue

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Abstract

This paper sheds light on the large seiniorage revenue collected by the U.S government resulting from the increase in dollar holding by foreign government in their foreign reserves. One of the question that arises from this stylized fact is how long the U.S government will be able to continue printing money in order to finance its current account deficit.

Keywords: Seiniorage, foreign reserves, current account, foreign currency. **Main Conference Topic:** Economics.

Introduction

A government's ability to collect seiniorage revenue is a well-known fact. This ability is influenced by individuals' willingness to absorb the money being printed by the government. When talking about individuals, the first thought that comes to mind is the local citizens. Nevertheless, one should consider the possibility that foreign countries also have the potential to absorb printed money, enabling an additional source of seiniorage revenue.

The U.S. started earning considerable seiniorage by printing dollars for other countries' reserves when the international monetary system was laid out by the Bretton Woods system in the mid-20th century. This system intended to determine the monetary relations among nations and has led to the situation in which the dollar is being used as the global reserve currency. This extraordinary status of the U.S. dollar also yields a special status to the U.S. However, only since 2009 we have noticed a huge increase in the amount of money printed, accompanied by a permanent current account deficit leading to the exporting of dollars to smaller economies which accumulate huge foreign exchange reserves. Beyond the implications of the enormous levels of U.S. deficit, this gives rise to the possibility for the U.S. to collect seiniorage not just from local citizens, but also from foreigners.

Related work- U.S. Currency Held Abroad

It was back in the sixties when Triffin (1960) identified and predicted the flaw that the international monetary system was causing and that things would only get worse. Kumhof and Yan (2016) bring the case of China and Switzerland, which experienced huge foreign exchange reserve accumulation crossing the optimal level. The researchers claim that this level of trade balance foreign reserve serves as an anti- crisis tool for those countries. They refer to these phenomena as "accepting the debasement of the US dollar". Dooley, Folkerts-Landauand and Garber (2005) argued that the role the U.S. played as the central country



would continue because other economies had their own interest in keeping the strategy of export-led growth supported by accumulation of reserve asset claims on the central country. However, the superiority of the US is not immune and Liao and McDowell (2015) found evidence that 37 central banks have added China's Renminbi (RMB) to their reserve portfolio since 2010.

Judson (2011) stated that U.S. currency has long been a desirable medium of exchange in places where the local currency or bank deposits were inferior. Therefore, as Porter and Judson (1996) estimated, roughly 70% of U.S. currency is held abroad. A substantial share of U.S. currency circulates outside the United States.

Model and Implementation- The U.S ability to Collect Seiniorage

The U.S. has a huge external debt, amounting to 17.6 trillion dollars. The annual U.S. current account deficit is 2.7 percent of the GDP, 124.1 billion dollars. This size of external debt should cause the dollar to decline relative to other currencies.

The interest rate in the U.S. is slightly higher than in other countries, but this gap is too small to serve as the reason, or explanation, for the stability of the exchange rate for the dollar.

More in-depth thinking gives rise to a more complex picture than just an external determining of the exchange rate. The demand for the U.S. currency stems not just from export and import, but also from some kind of confidence in which nations are interested. This confidence is parallel to the demand of individuals for money. Holding money is not costless, however individuals demand for money stems from the fact that money gives them a sort of freedom to capitalize opportunities conditioned on available and readily money. Nations that hold U.S. currency and create a huge demand for dollars do so to extend their foreign currency holding of worlds' largest economy. Increasing their foreign reserve of U.S. dollars, raises any country's relative ranking. It portrays a picture of a stable economy, eases local investment, and attracts foreign investors. The U.S., therefore, earns the seiniorage revenues from being the greatest economy in the world.

Results-U.S seiniorage revenue

As the graphs below show stylized facts reveal that the U.S. currency supply has increased in more than 600% since 2000. At the same time, the foreign currency reserves, in dollars, in other counties increased significantly as well.



Figure 1: Monetary Base in U.S. in Billions of Dollars

Source: Federal Reserve Bank of St. Louis, https://fred.stlouisfed.org/series/BASE





Figure 2: International Reserves Index, Specific Countries

Source: Bloomberg data base

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Table 1 presents the change in U.S. monetary base and yearly current account.

Table 1: The change in	U.S monetary ba	se and yearly current	nt account
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	Balance in Current	
	Account in billions of	Change of Monetary Base
Date	Dollars	in billions of Dollars ¹
1986-01-01	-142.7	12.351
1987-01-01	-154.1	18.184
1988-01-01	-115.8	21.317
1989-01-01	-92.4	18.267
1990-01-01	-74.9	14.388
1991-01-01	7.9	14.651
1992-01-01	-45.6	29.865
1993-01-01	-78.5	24.890
1994-01-01	-114.7	37.485
1995-01-01	-105.1	42.543
1996-01-01	-114.1	25.586
1997-01-01	-129.3	16.110
1998-01-01	-204.5	27.838
1999-01-01	-286.6	30.440
2000-01-01	-403.7	39.974
2001-01-01	-388.8	43.915
2002-01-01	-450.8	23.868
2003-01-01	-515.7	63.563
2004-01-01	-627.0	46.944
2005-01-01	-737.7	27.117
2006-01-01	-802.2	34.974
2007-01-01	-718.1	32.356
2008-01-01	-691.6	14.584
2009-01-01	-381.9	9.544
2010-01-01	-445.9	897.209
2011-01-01	-481.5	323.639
2012-01-01	-468.2	414.178
2013-01-01	-386.1	168.237
2014-01-01	-401.7	327.245
2015-01-01	-477.4	899.201
2016-01-01		178.957

Source: Federal Reserve Bank of St. Louis, https://fred.stlouisfed.org/series/BPBLTT01USQ637S

¹ Change in the monetary base was calculated from the original series of monetary base data published for dates that were close to end of a quarter.



Table 1 shows that since 2009, the U.S. central bank has increased the monetary base in a very large amounts and that the U.S. current account is in a large deficit. At the same time, Figure 2 shows that China, Japan, and the U.K. have increased their reserves in large quantities, especially after 2009.

One of the biggest absorption of U.S currency has been made by China, allowing the U.S. to earn enormous seiniorage revenue. This absorption of the U.S. currency reflects the country's confidence in the "great nation's economy", namely, the belief that it would be possible, at any time, to convert U.S. currency to substantial good or services.

If one adopts the assumption that foreign countries want to keep fixed foreign currency reserves, then escalation in the inflation in the U.S. would only allow the Americans to earn additional seiniorage revenue.

According to the data presented above, we can see that the U.S. continues printing large amounts of money without suffering from inflation. We suppose that as long as foreign countries are confident that the U.S. is the strongest economy, this situation can continue and the U.S. will be able to collect seiniorage from other countries. However, if China's or other large countries' economies grow to the size of the U.S., the U.S. will have to share this seiniorage income with them and will be forced to improve its current account deficit.

Conclusion

The U.S. ability to collect seiniorage is undoubtedly influenced by its size. The U.S. government capitalizes on foreign countries' willingness to hold U.S. dollars. This willingness stems from various reasons, however no one can guarantee the continuation of the phenomenon in the future. The signs that a new currency will displace the U.S. currency as the anchor already exist.

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Problems and Results of Labor Migration in Georgia

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Abstract

Labor migration is most acute problem of Georgia. This is a process that is very negative impact on the country's social-economical situation. A large proportion of Georgian families currently have at least one member living and working in a foreign country. Many of these migrants enter the host country on a tourist visa and overstay it. The expert research identified major migration-related problems in Georgia. These problems are caused mainly by the absence of appropriate legislation and the lack of cooperation between the institutions dealing with migration. Furthermore, reliable statistical data on migration is unavailable and migration problems have been never researched in depth. It is difficult, therefore, to analyze the existing situation thoroughly. As noted above, Georgian labor migration is predominantly illegal. Accordingly, Georgian migrants usually rely on unofficial, and often illegal, migration industry. That is why Georgian labor migration is rather expensive. If the government begins to regulate the migration processes, part of the illegal money may be diverted to the state budget, while migrants will enjoy official status and a more secure life in their host country. The host country will benefit too, as legal migrants will pay taxes and no longer boost the "black" economy

Keywords: Labor migration, unemployment, problems, market, economy **Main Conference Topic:** Macroeconomics

Introduction

Labor market is the primary component of the market economy, providing human resources to all activities. How those resources are used effects the nation's economic potential, and both living standards and social satisfaction for the entire population. Labor market function depends on many and diverse factors including demographic, socioeconomic, legislative, organizational, and institutional realities.

Labor migration is defined as the movement of people from one country to another for the purpose of employment. The term "labor migrant" can be used restrictively to only cover movement for the purpose of employment, while economic migration can be used in a narrow sense, which includes only movement for the purpose of employment, or in a broader sense that includes persons entering a State to perform other types of economic activities such as investors or business travelers.

Today, an estimated 105 million persons are working in a country other than their country of birth. Labor mobility has become a key feature of globalization and the global economy with migrant workers earning US\$ 440 billion in 2011, and the World Bank estimating that more than \$350 billion of that total was transferred to developing countries in the form of



remittances. However, despite the efforts made to ensure the protection of migrant workers, many remain vulnerable and assume significant risks during the migration process.

The decision to migrate is determined by a number of factors, which may range from economic issues, to personal and political issues. The decision to migrate to an individual is determined strictly by the difference resulting from the gains and costs involved in migration. A person in the decision to migrate will have to take into account the following elements: direct costs (for example: transport costs and bring their goods in the destination country), lost earnings (entries that you lost during the search country of destination) and psychological costs (associated, for example, removal from family and friends). To calculate the first types of costs, individuals will take into account economic and social factors in countries, the origin and destination. The difficulty often comes in the subjectivity of choosing to migrate (the worker knows exactly what conditions it expects the new location), which can have a direct influence on the permanence of the phenomenon.

Migration is most acute problem of Georgia. This is a process that is very negative impact on the country's social-economical situation.

Methodology

The research was based on the method of comparative analysis of the statistical data. In the process of research were used the methods of systematic, comparative analysis and empirical analysis of external secondary data are applied in the paper.

Main text

Due to widespread poverty and endemic unemployment in Georgia, many Georgian citizens seek job opportunities abroad. A large proportion of Georgian families currently have at least one member living and working in a foreign country. Many of these migrants enter the host country on a tourist visa and overstay it. The expert research identified major migration-related problems in Georgia. These problems are caused mainly by the absence of appropriate legislation and the lack of cooperation between the institutions dealing with migration. Furthermore, reliable statistical data on migration is unavailable and migration problems have been never research in depth. It is difficult, therefore to analyze the existing situation thoroughly.

As noted above, Georgian labor migration is predominantly illegal. Accordingly, Georgian migrants usually rely on unofficial, and often illegal, migration industry. That is why Georgian labor migration is rather expensive. If the government begins to regulate the migration processes, part of the illegal money may be diverted to the state budget, while migrants will enjoy official status and a more secure life in their host country. The host country will benefit too, as legal migrants will pay taxes and no longer boost the "black" economy.

Georgia's labor market is characterized by:

- Low employment and high unemployment;
- Limited breadth of enterprises;
- Dominance of the 'secondary labor market' over the 'primary market;
- High percentages of unemployed youth and persons with higher education;
- Low wages;
- Lack of regulation;
- Underdeveloped infrastructure;

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- Inadequate elasticity in labor market;
- High percentage of long-term unemployment;
- Restricted mobility for professionals;
- Sharp unbalance between supply and demand.

The first characteristic of Georgia's labor market is its unemployment rate, reflecting inadequate economic development.

1. It is difficult to single out the sole factor contributing to emigration and/or immigration from/to Georgia. Rather, these factors are complex, and range from economic to societal, from political to personal. There were periods in Georgia's recent history when emigration was mainly caused by political instability and security threats (the most recent – in 2008, as an aftermath of 2008 Russia-Georgian war). Since then, country has achieved relative political stability, and other factors, such as economic and societal, became more prominent in shaping migratory processes to and from Georgia.

Compared to the countries, that mainly attracted and is attracting Georgian migrants, Georgian economy could provide relatively limited employment opportunities, remuneration, social benefits or the quality of life. In order to overcome this situation, notable economic reforms were implemented in Georgia, which addressed stipulation of attractive business environment in order to enhance foreign direct investment inflow, create new jobs, stimulate entrepreneurial activities in various fields of economy and increase the welfare of citizens. The positive results of implemented reforms and initiatives in Georgia are reflected in various international rankings (e.g. Doing Business 2015 placed Georgia on 15th among 189 countries).

Dissolution of the Soviet Union marks the point after which Georgia gradually started to become part of a global migratory system. During the last two decades, the character, amplitude and directions of the emigration from Georgia changed significantly, and today stocks and flows of Georgian migrants could be found residing in and directed to a variety of countries. However, analyzing migratory trends from Georgia is complicated due to shortage of quality statistical data and varying data collection methodologies. Hence, a high degree of cautiousness is needed when using and comparing time-series and longitudinal data.

In 2014, compared to 2010, the refusal rate for total uniform Schengen visas (including multiple entry uniform visas) for Georgian citizens travelling to Schengen states decreased and constituted 12.7%. The share of refusals for multiple entry uniform visas constitutes about a third of all refusals. At the same time, the refusal rates of the EU member states varies significantly ranging from the highest 20.7% and 19.8% in cases of Netherlands and Lithuania respectively, to the lowest 4.5% and 5.6% in cases of Poland and Germany respectively. Overall, in 2014, Schengen state consulates, located in Georgia, issued slightly more than 80,000 visas, the majority being single entry visas. Germany, Italy and Netherlands consulates issued the biggest number of visas compared to other Schengen state consulates, with Italy leading in issuing multiple entry uniform visas.

Based on the statistical information we can see the situation of migration in Table 1. As we see situation was changed from 2001 to 2016, Migration was decreased as we compare it to last years.
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Table 1.

Year	Net migration (thousands)
2001	-32,6
2002	-27,8
2003	-27,5
2004	5,5
2005	76,3
2006	-12,1
2007	-20,7
2008	-10,2
2009	34,2
2010	18.1
2011	20.2
2012	-21.5
2013	-2.6
2014	-6.5
2015	-3.4
2016	-2.2

Source: National Statistics office in Georgia

Figure 1.



Emigrants and Immigrants by Sex and Age (2016 year)

Source: National Statistics office in Georgia

There we see the statistical information about emigrant and immigrants GeoStat provides annual statistics of migrant flows to and from the country. Major countries of origin

(using citizenship as a proxy) of both immigrants and emigrants remain Georgia's neighboring countries - the Russian Federation (RF), Turkey, Armenia, Azerbaijan, and Ukraine, while migratory groups from other countries remain quite small in size.

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Conclusion

Based on the findings of the survey and characteristics of Georgia's labor market, the following assessments can be made:

- Unemployment has a cyclical character, but stubbornly remains the most pressing socioeconomic problem in Georgia;
- The main cause of unemployment is limited demand for labor in an under-developed economy which has few jobs to fill.

However, for many fields, such as construction, and services, optimization of the number of employees took place in parallel with the creation of new jobs; this was especially true in the public sector. Consequently, the total number of jobs in the country has not increased significantly. The August 2008 war and the global economic crisis have both negatively impacted employment rates. Economic collapse in Georgia in the 1990s and long stagnation have conditioned the continuing unemployment. This makes the negative results of unemployment even more acute, because assistance and training for the long-term unemployed are difficult and expensive for the society and the government. High level, long-term unemployment is also conditioned by the fact that in Georgia "the secondary labor market" is dominant, and offers only low salaries and difficult working conditions.

For people with higher education, their high expectations can be a barrier to jobs. The problems of regional and seasonal unemployment are acute, but the activities launched by the authorities in recent years that are aimed at development of regional infrastructure will positively affect employment.

Both objective and subjective reasons impede the search for employees. Objectively, few professionals are trained in Georgia; subjectively, employers do not offer acceptable salaries and employees choose not to work in certain localities; undeveloped market infrastructure conditions the fact that many employers do not know where to find applicants nor where to look for assistance in the task. Instead, Georgia's predominant way to seek workers is through personal contacts and recommendations. The level of employer dissatisfaction with the skills and qualifications of their employees reflects the need to form an effective system of staff training and retraining and to improve the quality of training, only 1/5 of employers provide employee training that would significantly enhance skills beyond minimal on-the-job training, and they cite money as the primary barrier.

To reduce unemployment and increase job availability, it is necessary to accelerate economic development and create more jobs. Survey suggestions to reach this goal: Increase availability of business loans; Improve tax legislation and administration; exempt taxes on reinvestment funds; Create an environment conducive to free competition, and regulate government interaction with businesses to minimize the perception of interference and pressure; Support development of human resources; Enhance political stability and improve relations with neighboring countries; Develop business access to information; Improve regulation of the economy and labor law; Reduce resource costs of power, water and other necessities; simplify import policies on raw materials, materials, and equipment.



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Improve Nonparametric EWMA Sign Charts Based on EPQ Model

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Abstract

Traditional control chart applications to monitor process shifts are not suitable for the situations where observations come from a non-normal or unknown distribution. In order to trace a small-shift quality deviation of a process a special quality control chart is required. We have developed an economic-statistical design of a new nonparametric exponentially weighted moving average (EWMA) sign chart for improving the detection capabilities of process stability and tracing small-shift quality deviation. The contribution of our research is twofold: (1) an economic-statistical model of the nonparametric EWMA sign chart with a new economic production quantity (EPQ) design that enables to minimize the total cost of a small-shift quality deviations; (2) model of a dynamic adjusted selector of the crossover and mutation rate in GA's evolutions for the parameter optimization of EWMA sign chart design.

Keywords: Cost reduction, Nonparametric EWMA sign chart, Economic-statistical design. **Main Conference Topic:** Technology and innovation management

1.Introduction

In a global chain production, a major challenge is how to increase process stabilities in presence of uncertain deviations. The new charts are highly desirable for reducing false alarm rates than the traditional Shewhart control chart. We have carried out literature reviews that have demonstrated an increasing role of nonparametric methods in control chart applications to improve the accuracy of detecting abnormalities in the process. For example, Bakir (2006) proposed the nonparametric Shewhart-type, the exponentially weighted moving average (EWMA)-type, and the cumulative sum (CUSUM)-type control charts for monitoring a process center when an in-control target center is not specified. Recently, Yang et al. (2011) established the EWMA sign control chart. They showed that a nonparametric control chart is suitable and efficient to monitor small shifts of a process when the underlying distribution is either non-normal or unknown. Nonparametric control charts are based on flexible distribution assumptions on the observations of a process and can efficiently detect small process shifts. Despite numerous works on economic-statistical design of a control chart (Lu et al., 2013; Huang & Lu, 2015), relatively little work has been done on nonparametric EWMA sign charts. Hence, utilizing a nonparametric approach to construct control charts seems to be a reasonable alternative.

Pan et al. (2012) designed a control chart based economic production quantity (EPQ) model for an imperfect production process to minimize the quality deviations of imperfect process. Singh and Singh (2012) applied dynamic genetic algorithm optimizer to design a suitable EPQ model with Power-form stock dependent demand for inflationary environment using genetic algorithm. Afterwards, many authors pay more attention on improvement





minimal total cost based on EPQ model (Teng, 2013; Dem et al., 2014).

For cost consideration, we are also motivated to develop an economic-statistical design of the nonparametric EWMA sign chart by incorporating a new EPQ model. The genetic algorithm (GA) with objective function is employed to minimize the cost. Moreover, sensitivity analysis is conducted to assess the effect of the main model parameters on the objective function.

This paper is organized as follows: Section 2 reviews the nonparametric EWMA sign chart. In Section 3, an economic-statistical design of nonparametric EWMA sign charts is provided. Section 4 introduces the nonparametric EWMA sign charts combining a new EQP model. Finally, a summary of the results and conclusions is drawn in Section 5.

2. Nonparametric EWMA sign chart

According to Yang et al. (2011) a nonparametric EWMA sign control chart, suppose X is a quality characteristic of a process with a target value T. Let Y = X - T is the deviation of the measurement X from the target T and p = P(Y > 0) means the "process proportion."

If
$$\begin{cases} p=0.5, \\ p \neq 0.5, \end{cases}$$
 then the process is in control (p_0) the process is out of control (p_1)

Suppose that a random sample of size *n* has been collected at a given time *t*, X_{it} , i = 1, 2, ..., n, and t = 1, 2, ... to monitor deviations from a process target. We then define

$$Y_{it} = X_{it} - T \text{ and } I_{it} = \begin{cases} 1, & \text{if } Y_{it} > 0 \\ 0, & \text{otherwise} \end{cases} \text{ for } i = 1, 2, \dots n,$$

Now, if N_t denotes the number of positive deviations, then $N_t = \sum_{i=1}^{n} I_{it}$ follows a binomial distribution with parameters (n, p_0) for an in-control process.

Therefore, the nonparametric EWMA statistic at time t can be defined as

$$Z_t = \lambda N_t + (1 - \lambda) Z_{t-1},$$

(1)

(2)

where N_t represents the recorded number from the process at time t and λ is weight of the nonparametric EWMA sign chart satisfying $0 < \lambda \le 1$. By substituting recursively, we reformulate Eq.(1) as follows:

$$Z_{t} = \lambda \sum_{j=0}^{t-1} (1-\lambda)^{j} N_{t-j} + (1-\lambda)^{t} Z_{0},$$

Adopting initial value Z_0 as mean of N_t , we have $Z_0 = T = \frac{n}{2}$.

The expected value of Z_t can be calculated as

$$E(Z_t) = E\left(\lambda \sum_{j=0}^{t-1} (1-\lambda)^j N_{t-j} + (1-\lambda)^t Z_0\right) = \frac{n}{2}$$

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(3)

The variance of Z_t is

$$Var(Z_{t}) = Var\left(\lambda \sum_{j=0}^{t-1} (1-\lambda)^{j} N_{t-j} + (1-\lambda)^{t} Z_{0}\right) = \frac{\lambda [1-(1-\lambda)^{2t}]}{2-\lambda} \cdot \frac{n}{4}$$

(4)

Asymptotic control limits are used instead of time-varying control limits in this study to simplify the control chart. Assuming that L denotes the width of the control limit, the nonparametric EWMA sign chart can be described as

$$UCL = \frac{n}{2} + L\sqrt{\frac{\lambda}{2-\lambda} \cdot \frac{n}{4}}$$

$$CL = \frac{n}{2}$$

$$LCL = \frac{n}{2} - L\sqrt{\frac{\lambda}{2-\lambda} \cdot \frac{n}{4}}$$
(5)

By plotting the statistics Z_t on the chart for process monitoring, if there is any $Z_t \ge UCL$ or $Z_t \le LCL$, the process is declared to be out of control, and some adequate actions should be taken to find and eliminate the assignable causes.

Generally, the statistical performance of a control chart implies same in control average run length (namely ARL_0) to achieve a small out of control average run length (namely ARL_1) under the given process shift and corresponding (L, λ) combination. Herein, the desired ARL_0 is set to 370 and shift proportion $\Delta_p = |p_1 - p_0|$ with different sample sizes $n \in \{5, 10, 20, 30, 50, 100\}$ are considered. Table 1 illustrates the numeric output of minimal out-of-control ARL_1 .

$\Delta_p =$	$ p_1 - p_0 $						
n	0.01	0.05	0.1	0.2	0.3	0.4	
5	322.83	86.29	30.93	11.08	5.82	3.27	
10	284.37	51.62	19.01	6.58	3.46	2.33	
20	236.40	31.01	11.29	3.87	1.85	1.14	
30	202.10	23.20	8.30	2.82	1.43	1.03	
50	154.73	16.04	5.63	1.83	1.06	1.00	
100	100.12	9.55	3.32	1.13	1.00	1.00	

Table 1. The minimal out-of-control ARL

Table 1 shows the numeric outcome of n, ARL_1 and shift proportion. The outcome is reasonable because larger process shift usually leads to smaller out of control ARL_1 . Especially, the out of control ARL_1 decreases sharply in small process shifts. Besides, the optimal smoothing constant λ^* increases when the sample size increases at the same shift proportion. Mrgr

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3. Economic-Statistical design of nonparametric EWMA sign charts

There has been a great deal of research on economic or economic-statistical design of parametric control charts. However, a little work has been done in nonparametric area. Hence, Duncan's (1956) cost model is employed to develop the statistically constrained economic nonparametric EWMA sign charts by adding constraints on ARL_0 and ARL_1 . It is assumed that the time interval between two consecutive samples by h and the in-control time for the process is distributed exponentially with mean $1/\theta$. According to Duncan's cost model, the following expected cost per hour, E(A), associated with a nonparametric EWMA sign chart is obtained as:

$$E(A) = \frac{a+bn}{h} + \frac{c_1(ARL_1 \cdot h - \tau + T_1 \cdot n + T_2) + \frac{c_2}{ARL_0} \cdot (\frac{e^{-\theta h}}{1 - e^{-\theta h}}) + c_3}{1/\theta + ARL_1 \cdot h - \tau + T_1 \cdot n + T_2}$$

(6)

The symbols used in Eq. (6) are described as follows.

- n = sample size,
- λ = smoothing constant of the nonparametric EWMA sign chart,
- L = control limit constant of the nonparametric EWMA sign chart,
- τ = expected time between an assignable cause and the prior sample,
- μ_0 = target process mean,
- σ_0 = target process standard deviation,
- T_1 = expected time to sample, inspect and plot for each sample,
- T_2 = expected time to discover and repair the assignable cause,
- a =fixed cost of sampling,
- b =unit variable cost of sampling,
- c_1 = the hourly penalty cost associated with production in the out-of-control state,
- $c_2 = \cos t$ of investigating a false alarm,
- $c_3 = \cos t$ of finding and repairing an assignable cause,

When a process is out-of-control, the process proportion shifts to p_1 . Assuming shift proportion denoted as $\Delta_p = |p_1 - p_0|$. Then there are $1/(1 - \Delta_p)$ conforming units produced by the process, which implies that the process produces $\Delta_p/(1-\Delta_p)$ nonconforming units. Hence, the penalty cost c_1B in the out-of-control state in Duncan's cost model (Eq. (6)) is replaced with $c_1 \cdot \Delta_p \cdot B \cdot P$. Note that P is production rate per hour. Consequently, the expected cost per hour is modified as

$$\underbrace{Min_{n,h,L,\lambda}}_{n,h,L,\lambda} E(A) = \frac{a+bn}{h} + \frac{c_1 \cdot \Delta_p \cdot P \cdot (ARL_1 \cdot h - \tau + T_1 \cdot n + T_2) + \frac{c_2}{ARL_0} \cdot (\frac{e^{-\theta h}}{1 - e^{-\theta h}}) + c_3}{1/\theta + ARL_1 \cdot h - \tau + T_1 \cdot n + T_2},$$
(7)

 $ARL_0 = ARL_0^*$ $ARL_{1} \leq ARL_{1}^{\min}$ subject to $n \in I^+, h, L \in R^+, 0 < \lambda \le 1$

It should be noted that E(A) is a function of ARL_0 and ARL_1 . ARL_0 and ARL_1 are functions of the decision variables of the nonparametric EWMA sign chart. Hence, the problem of optimization is implemented for the optimal decision variables $(n^*, h^*, L^*, \lambda^*)$ of the economic-statistical design of nonparametric EWMA sign charts for which the objective function E(A) is minimal.

4. The objective function of nonparametric EWMA sign charts with EPQ model

We design a nonparametric EWMA sign chart by incorporating an EPQ production model to reduce total cost level of a small-shift deviation process. Our proposed integrated model analyses quality-related costs and production-related costs into account other than ordering costs and storage costs already considered in the traditional control chart based on EPQ model (Singh & Singh, 2012; Teng, 2013; Chiu & Chang, 2014). First, we describe a simple and generalized cost model for our proposed algorithm, which is formulated as below:

Total Cost (TC) = Production Cost (PC) + Quality Cost (QC) (8)

Where:

Production Cost (PC)= Production Setup Cost (PC_S) + Production Inventory Cost (PC_I) + Production Penalty Cost (PC_N)

Quality Cost (QC)= Quality Setup Cost (QC_S) + Quality Search Cost (QC_{SH}) + Quality Penalty Cost (QC_N)



Considering the production cost of nonparametric EWMA sign charts with EPQ model, the detailed objective function of our proposed model with EPQ model which can be improved on Eq. (8) as below:

$$TC = PC_{S} + QC + PC_{I} + PC_{N} = \frac{D}{EPQ} \cdot C_{r} + E(A') + \frac{EPQ}{2} \cdot H \cdot \frac{(P-d)}{P} + D \cdot c_{4}$$
(9)

where
$$EPQ = \sqrt{\frac{2D \times C_r}{H}} \times \sqrt{\frac{P}{P-d}}$$
.

 C_r = unit setup cost

D =yearly demand

H = holding cost per hour

d = average demand per hour

P = the production rate per hour

 c_4 =unit penalty cost in the out-of-control state

E(A') = minimal cost per time cycle under EWMA with EPQ

In order to compare minimal cost E(A) and E(A') in EPQ model, related cost parameters including setup parameters (D=10000, d=100, $C_r=45$), the production parameters (a=4, b=0.05, $c_1=50$, $c_2=200$, $c_3=100$, $\theta=0.01$, $T_1=0.5$, $T_2=13$, P=200), the inventory parameter (H=10), and penalty parameters ($c_4=25$) are considered to minimize the output of objective function. Table 2 shows that the minimal quality cost E(A') and total cost (TC) of the nonparametric EWMA sign chart with EPQ models in different shift proportion $\Delta_p = \{0.01, 0.05, 0.1, 0.2, 0.3, 0.4\}$.

Table 2. The minimal quality cost E(A') and total cost (TC) of the nonparametric EWMA sign chart with EPQ models.

	Δ_p					
	0.01	0.05	0.1	0.2	0.3	0.4
n^*	10	7	5	5	5	5
λ^{*}	0.05	0.05	0.05	0.12	0.25	0.37
L^*	2.492	2.480	2.483	2.772	2.822	2.803
h^{*}	0.14	0.10	0.09	0.10	0.10	0.10
ARL_1	284.37	67.27	30.93	11.16	5.82	3.71
E(A')	114.43	269.02	453.08	952.42	1681.01	2752.55
TC	4735.7	14890.3	27574.4	53073.7	78802.3	104873.9



Simulation results from Table 2 indicates that minimal quality costs E(A') are larger than minimal costs E(A) of nonparametric EWMA sign charts in various shift proportions. The quality costs E(A') are significantly larger than E(A) in large shift proportion, which satisfies our aims. Moreover, larger sample size is needed to detect smaller shift proportion and result in small quality cost simultaneously.

5. Conclusions

An economic-statistical design of nonparametric EWMA sign chart and combine EPQ models is developed to minimize the total cost associated with balancing the preventing and failure costs. The contribution of this study is twofold: (1) model of an economic-statistical design of the nonparametric EWMA sign chart with a new EPQ design that enables to minimize the total cost of a small-shift quality deviations; (2) model of an adaptive optimizer of the crossover and mutation rate in GA's evolutions for the parameter optimization of EWMA sign chart design. If the prevention cost is high, the cost of recovering failures is likely to be low. In other words, saving on prevention cost, it could lead to high cost in failure recovery. The optimal ARL alternatives with corresponding shift proportion (p) and (n, λ, L) can be used by decision makers to achieve balance between prevention cost and failure cost.

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Systematic Review on Customer Knowledge Management

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Abstract

The purpose of this paper is to do a literature review on customer knowledge management (CKM) and found five broad CKM model including epistemological model, process-oriented model, integrated/hybrid model, sea-star model, and butterfly CKM model, these models provide good insights for knowledge sharing to the customers towards companies strategic decisions and corporate visions to retain the customers in a business competitive era. Overall, the butterfly model is more organized and provides a complete package that companies can practice to understand their own CKM strategies.

Key Words: Butterfly CKM model, Customer knowledge management, Epistemological CKM model, Sea-star CKM model

Main Conference Topic: Marketing strategy, Technology and Innovation Management, Knowledge Management

I. INTRODUCTION

In today's competitive environment companies need knowledge to survive in the market [1]. To cope with this challenge the sharing of knowledge is a vital factor [2]. Knowledge derived from direct interactions or relationships are generally referred to as customer knowledge. This knowledge is most probably confined within a two way flow of knowledge that generates value for both parties. Examples can be customer likings of new product features, new uses for existing products, knowledge derived from combined research and development, design enhancements from suppliers anticipated to diminish the cost of manufacturing, and knowledge related to trends within the corporate environment. A significant feature of customer knowledge is that it is knowledge not possessed by the firm, but by others who may or may not be ready to share such knowledge. It is more potentially useful and labor intensive than customer information as it resides in humans and requires other intelligent humans to identify this knowledge and apply it to their daily routines [3].

While there are a variety of philosophical definitions on the nature of knowledge, for modern business practices there is a glaring gap where a widely-accepted, useful, and comprehensive definition should be [4]. Even though companies are obsessed with 'big data', 'information' or 'knowledge', these concepts are often used incorrectly and interchangeably. This misunderstanding leads to many problems, especially for managers and strategists who either ignore or incorrectly implement their strategies because they do not understand the tangible difference between information and knowledge, nor how they are used within organizations or the relative value of either.

Customer Knowledge Management is defined as the use of the tools and techniques of the knowledge management to permit the give and take of the information among the company



and its clients/customers in a way that helps to acquire knowledge from the customers who can be made part of the company and help cater innovation. More like an extension of the knowledge management, a tremendous and productive group of techniques that are used build customer knowledge management are extracted from prior models of knowledge management which are known for gathering customer's information and to much little extent i.e. the knowledge they possess. Actually most of the companies just focus on collecting knowledge to attract new customer rather than improving their services or products [5].

II. EPISTEMOLOGICAL 'CKM' MODELS

Zanjani et al [5] proposed a model aimed at giving taxonomy to the kinds of knowledge that could be gathered and where it could generally come from. Generally, such models can be considered epistemological, because they deal with understanding the origin and nature of the knowledge that companies seek to obtain from customers. In this epistemological model, the center of "Target Customers" has been replaced with "Customer Knowledge Management" to reflect the central importance of an effective CKM strategy in gaining new customers and market-share, as opposed to simply focusing on finding "target customers". Likewise, rather than simply listing knowledge for, about and from particular customers as it related to the quarter of sources—the company, competitors, consultants, and other customers—the three types of knowledge form a triad radiating out from the CKM strategy.

Afterward, this model breaks down customer knowledge into three layers. In the first layer, information is divided into different types of customer knowledge, while the next layer explains where the knowledge came from, e.g., general information, products/services or information about the company's general environment. It is worth noting that in this layer, prospective and current customer information are understood as parts of knowledge about customers and not as an isolated piece of information, nor as the core focus of the model. Meanwhile, the final ring layer acts as an index, cataloging and giving a more detailed view of the source for the differing types of information that compose the different forms of knowledge. For example, knowledge about potential customers comes from their personal information as well as information on their general preferences, while data on current customers is composed of existing information about their requirements for a company's product or services, as well as historical data the company maintains on its client base. Figure 1 shows the epistemological model of CKM.





Figure 1: Epistemological Model of CKM Source: Zanjani et al. [5]

A key strength of this refined model is that it breaks down the epistemology of the different knowledge a company can gather. From there, knowledge managers can more effectively group the data the company gathers into an organized, albeit at times vague, sets of information about customers, for customers and from customers. There are marked advantages to this model as opposed to its earlier, simpler predecessors, which focused on simply gaining more customers.

III. PROCESS ORIENTED CKM MODELS

Gebert [6] proposed another type of model geared at explaining the connection between knowledge and the environments in which it is gathered that is built around understanding the process of information gathers, which should theoretically help agents in a company identify and manage valuable knowledge by helping companies construct better KM systems. Gebert's resulting model joined knowledge management and customer relationship management together into a system that facilitated the broadening of CRM systems from its mechanistic, technology driven and data oriented approach, allowing it to incorporate both the elements of technology and people orientation. Knowledge management is thus able to demonstrate its value directly within the process chain [6]. This model is then best described as process-oriented. Figure 2 shows the process oriented CKM model.

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Figure 2: Process Oriented CKM Models Source: Gebert et al. [6]

At the heart of this model is the concept that gathering knowledge is not an end unto itself. By breaking out the CKM strategy into different components of management tier—campaign, lead, offer, contract, service, complaint and opportunity, Gebert's model focuses on providing business a path to integrate CKM into a value-generating strategy. Collectively, this different management tiers build into managing customer interactions and communication channels ultimately leading to a customer-centric process in which marketing, sales and services are all aimed at striving to communicate with the customers.

IV. INTEGRATED/HYBRID CKM MODELS

The greatest strength of hybrid models, for example, Buchnowska [7] is that they gives a thorough guide for companies to examine their CKM strategies and find how each element of the strategy works towards gathering different kinds of information. By building in more concrete definitions of how different strategies can obtain knowledge for customers, about customers, and from customers, models can overcome the deficits of overly focused epistemological or process-driven models. For epistemological models, the flaw is that it presumes that understanding different kinds of knowledge will actually empower businesses to make better decisions on how to use information, which ideally is true, but in reality is not often well done or executed. Figure 3 shows the integrated CKM model.





Figure 3: Integrated/Hybrid CKM Model Source: Buchnowska [7]

Process oriented models suffer from the opposite problem, presuming that knowledge and management of it possesses no inherent value, because even though it is an important resource, it still is subject to the "the laws of economics: It has a diminishing marginal utility and its management does normally not directly generate business value" [6]. When both models come together, as they have in Buchnowska's [7] research, there are far greater potentials in gathering larger quantities of useful data. However, while such models offer superior guides in developing a CKM plan, they are not as useful in trying to assess the effectiveness of a CKM strategy, nor the tools that actually do the work of gathering the information.

V. SOURCE BASED CKM MODELS

At the heart of all three examined forms of models is the goal of understanding different kinds of knowledge and how they can effectively be brought into businesses to help a given company gain an edge over its competitors. Each of the earlier models distinguishes between knowledge for customers, about customers, and from customers, but they differ in where they anchor the source of these different forms of knowledge. Epistemological models argue that the source is identified by the type of knowledge it is: e.g., knowledge from customers is literally knowledge that customers give the company for customers to digest. Process-driven models as well as hybrid models meanwhile anchor the source of different knowledge in different management capacities that help gather them, e.g., employees dealing with services and complaints management, as well as through contract management are the generators of knowledge about customers. But the underlying question that none of the previous models address is where exactly does the information come from and what specific mechanisms—not



strategies—can be used to gather it. Amusingly, despite the limitations to Gebert's earlier study, he still hints at the answer in his earlier study on the process-driven model, noting there is a large possibility for companies to gather "knowledge about customers automatically via electronic media," [4] even though it is not clear exactly how much data a company can obtain and transform into useable knowledge about the customer or from the customer.

Returning to their earlier work, Zanjani et al. [8] argued that as CKM was still a developing field, there is still great value in examining and elaborating on the core concepts of both CK and CKM, particularly about the budding e-commerce sector. While here we have noted the various perspectives other scholars have used to understand CKM, few have concentrated on understanding how CKM works in e-commerce, even though many scholars have admitted the potentially transformative implications of using digital media to change our understanding of the flow of information between businesses and their consumers. Examining the information gathering CKM mechanisms used in several e-commerce sites, Zanjani et al. [8] were tried to work on their on their earlier model and came up with a new one that explains that nature of information retrieval by companies using internet-based tools to better communicate with their customers.

The new Sea Star model is the source-based model (see, Figure 4), covers an extensive look at the three types of customer knowledge in far greater detail than earlier studies and outlined a complete set of electronic mechanisms by which companies obtain different types of knowledge. The Sea Star model is composed of three layers, with the center again returning CKM, and the triumvirate of knowledge for customer, knowledge from customer and knowledge about customer radiating outwards from the center. In the following layer, each kind of customer knowledge is broken down into more comprehensive parts to show the composition of each form of knowledge. Collectively, this breakdown on the three primary forms of knowledge is denoted by the circle-like bumps that cover body of sea star and form its three primary constituent pieces. Knowledge for customers is divided between into general information about the company, information about the company's products and services, as well as its general environment and further complementary information. Here, general information is a kind of knowledge that introduces a given firm or business in generic manner, i.e., information about events, the company's vision, mission and goals. Information on the products and services includes a broad array of different mechanisms that help make customers aware of what the company can do for them or provide them.





Figure 4: Sea Star Model Source Source: Zanjani et al. [8]

A smaller portion is then allotted to information on the company's environment information such as regulatory rules, notes on competitors, industry groups and the like. This extra information meanwhile cover indirect amenities for customers like account alert, site map, employment and etc. Knowledge from customer contains information that customers generate both on the company as well as its competitors. This material is largely the outcome of different customers' opinions on the company and its direct competitors. Finally, knowledge about customers divided between both information on prospective customers and current customers. Prospective customer information provides an overview of potential new customers who may be interested in a company's products or services, while current customer information details existing data on customer requirements that will help the company analyze customer responses and assist in developing new products or services to better suit their existing customers' needs and desires.

VI. RECENT DEVELOPMENTS IN CKM MODELLING

The prior CKM understanding models have provided both, the strengths and the weaknesses. Accumulatively the most visible weakness is that the model was too narrow and parochial, that proposed very limited means for a business to check and evaluate CKM exertions with very minute attention to the real mechanism. Which in actual help facilitate the process of communication between the businesses and the customers they have. Another prominent exception is The Sea Star Model as it was the pioneer to propose an ample kit of tools that were enough detailed to aid how the gather of the knowledge can be done. Unfortunately, the Sea Star Model only explained digital mechanisms, which are generally only useful in their totality to businesses who solely conduct transactions with their customers over the internet. That said, given the advantages of the Sea Star Model, it is the most logical starting point in trying to develop a novel model that can effectively give an overview of the CKM mechanisms and how they relate to the different kinds of knowledge companies should be

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seeking together with an effective CKM strategy.

Using the Sea Star Model as a jumping off point, so as not to lose the significant advantages that Source-based CKM models share, several researchers in Iran conducted a series of semistructured interviews to see how accurate or inaccurate the Sea Star Model proved in assessing CKM efforts in both the e-commerce and non-e-commerce areas of a company. Sakhee et al. [8] interviewed a variety of managers and employees at the Mobile Communication Company of Iran (MCI), due to both its size, prominence in the market, and its blended e-commerce and real-world business model. Interviews with experts at MCI highlighted several flaws to the earlier model, and led to the listing of many previously overlooked CKM mechanisms, as well as the reorganization of many mechanisms mentioned in the earlier model. The resulting improvement on the Sea Star Model was then designed by applying a sequential blended methodology which strove to take a greater look at the three main types of customer knowledge-knowledge for, from and about customers-but broke the potential mechanisms into more comprehensive categories the split between both technological mechanisms and non-technological mechanisms. Given that there is not always a clear dividing line between when something is technical and non-technical, technological mechanisms were defined as those mechanisms which depend on technology, especially in the e-commerce arena, while non-technological mechanisms could use technology, but were interactions dependent on interpersonal/traditional between the company and customers/potential customers.

After further evaluation of these new elements, the resulting variant on the Sea Star Model was reviewed by several academics and then refined into what the authors named the "Butterfly Model". The main function of this new refined model is to clearly introduce a series of new mechanisms that help companies interact with their customers. Each mechanism is simply part of an expanded CKM toolkit that can be used to help further manage customer knowledge, no matter if the mechanism is technological or not. This model shares many similarities with its epistemological and source based predecessors, notably the central focus of CKM and the three components of the butterfly abdomen indicating Knowledge About, For and From customers.

Given the large focus on knowledge for customers that has been noted in all the previous CKM studies, the red trapezoids radiation from the "Knowledge for Customers" section of the abdomen contain the greatest portion of mechanisms and subsequently the larger portion of the butterfly's wings (four segments in total) with Knowledge about Customers and Knowledge From Customers each only taking half that much (two segments of wing each). For knowledge gathering/disseminating the Butterfly model has 76 different mechanisms which can be used. The variety of mechanisms are also thoroughly organized and grouped into distinct types, based on the form of knowledge they represent, i.e., for customers, from customers. Notably, one key improvement of the Butterfly Model is that mechanisms of the same type, but with different functions or intents, is included multiple times—a shortcoming of the earlier Sea Star Model, where Zanjani noted there was a bewildering diversity and amount of replication of particular CKM mechanisms among e-commerce retailers.





Figure 5: Butterfly Model of CKM Source Source: Sakhaee et al. [7]

VII. CONCLUSION

This study provides a systematic review of literature on customer knowledge management and presented five CKM models that offered wide variety of customers' knowledge towards company's strategies and corporate vision to retain the customers for competitive gain. The butterfly model proposes various kinds of dominances over previous models. As whole this model is way more comprehensive, structured and are capable to offer improved toolkit that can be used by the businesses to implement CKM strategies.

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Entrepreneurship Intention of Albanian Students: an Evidence From Computer Engineering And Business Informatics Programs

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Abstract

The purpose of this study is to make an evaluation on entrepreneurship intention of the university students. In order to conduct this study a sample of 88 students from two different programs of Epoka University. Participants were asked to answer a survey. In order to interpret the data we conducted mean comparison and One-Way ANOVA analysis. This study found that there were not significant differences on entrepreneurships intention among business informatics and computer engineering students. Students are found to have high entrepreneurship attitude but compared to it has low entrepreneurship intention. This study provides insight into entrepreneurship intention.

Keywords: Students, Intention

Main Conference Topic: Academic Conference on Economics, Management and Marketing in Prague 2017, Czech Republic (AC-EMM 2017)

Introduction

Albania is among the countries that not only have always been a pathway thus connecting trade in the ancient times (via Egnatia) but also it contains the archaeological remains of both western and eastern cultures. It is well-known fact that effect of this historical background is seen in several fields of the society of the country also nowadays. That is why through this paper we aspire to go in deep and understand the behavior of Albanian businesses and businessperson. According to the Statistical Business Register by the Albanian Institute of Statistics in Albania the vast majority (56 %) of these businesses is dominated by businesses, which have, as the main activity trade, accommodation, and food service (INSTAT, 2015). Furthermore, according to Albanian Institute of Statistics (INSTAT, 2016) by 2015 in Albania there are 146.349 active Albanian Enterprises, and 5.939 active Foreign Enterprises and Joint ventures.

Another interesting data is the division according to the number of employees. 136.470 active enterprises have between 1-4 employees. 8.172 active enterprises have between 5-9 employees. 5.944 active enterprises have between 10-49 employees and 1.652 active enterprises have more than 50 employee (INSTAT, 2016). It is clear from the above



statistical data that Albanian economy is mainly based on the SME (Small-Medium Sized Enterprises). In this context, it would be important to get some insights regarding the intention and orientation of the youths in starting new businesses.

Literature review conducted on behalf of this study and previous works on the topic have shown that university students suitable sample for researchers to exploit the entrepreneurship orientation and intention (Mueller & Thomas, 2001: 62; Bolton & Lane, 2012: 225). Furthermore, lack of education in entrepreneurship could be considered as a serious problem with greater impact than thought. (Lee et al., 2005: 27-28) argues that entrepreneurial culture is crucial for economic systems in order to strengthen them and make resident to several macroeconomic threats. He further states that countries can learn from successful experiences in order to build a stronger economy by cultivating entrepreneurial culture. One study concluded that education in entrepreneurship is crucial to influence the entrepreneurial behavior of university students who have stronger entrepreneurial intention considered to students who did not graduate from an entrepreneurship oriented program or did not take entrepreneurial courses in their curriculum even though they were business graduates. This study concluded that entrepreneurship intention can be triggered, to some extent, through education one receives (Kolvereid & Moen, 1997: 156, 159). Education in the field of entrepreneurship does not concern only businesses (whether commercial or social businesses) but also other important fields such as technology, and academia (Kirby, 2004: 517).

Entrepreneurship education is an evolving and continuously improving discipline since the first entrepreneurship courses were provided. It can be stated that providing and developing entrepreneurship programs, and courses is a difficult task to be overcome for higher education institutions in general and business schools in particular (Alvarez et al., 2015: 382).

This paper is aiming to provide insights from the entrepreneurial orientation and intention of Albanian students. This paper is focused on Business Informatics and Computer Engineering students at Epoka University.

Entrepreneurship: Conceptual Review and Characteristics

The term `entrepreneur` has its roots in the French word *entreprendre* (to undertake) and this concept is accepted widely as the origin of this term that has plenty of definitions (Kirby, 2004: 511). Entrepreneurship is a discipline of application to find the resources and embracing the change (Thompson, 1999: 286). Entrepreneurship has three important elements which are the vision, the individual with the leadership skills, altogether with the will to build something valuable (Thompson, 2000: 329), and is seen as the engine of economy (Jack & Anderson, 1999: 110; Ismail et al., 2015:354) with big impact on social and cultural developments(Rae, 2000: 145). Prior to the information related to the entrepreneur characteristics is valuable to mention and not to underestimate entrepreneurial behavior and entrepreneurial environment. Thompson (1999: 288) in his study has stressed the importance entrepreneurial behavior as it defines the viability to take advantage of the opportunities created. Entrepreneurial environment on the other hand, is considered to have significant effect on firm performance and its views on entrepreneurship (Lumpkin & Dess, 1996: 152); on entrepreneurship intention (Linan et al., 2011: 209), and especially on the product innovation process (Alvarez et al., 2015: 380) since there are evidences that support the positive relationship between entrepreneurship and innovation (Zhao, 2005).

Entrepreneur characteristics are another crucial topic taken in consideration in entrepreneurship studies. The founder of the business (or entrepreneur) has immense importance especially when the firm is its beginnings (Dyer, 2006: 254). Dacin, et al. (2010:



44) in their research divide entrepreneurs into four groups that are conventional, institutional, cultural and social entrepreneurs. On the other hand, Carland et al., (1984: 356) in their study provided a literature review on the characteristics of entrepreneurs.

Entrepreneurship is triggered by global opportunities (technology advance and reduction in the trade barriers), sociological shifts (new concerns, new governance practice), by organizational goals (re-engineering, new strategic path), and individual aspirations (Henry et al., 2005: 100). Considering individual aspect, Taatila (2010: 48) argues that real projects are the best mean to get entrepreneurial skills. Researchers agree on the importance that higher education institutions must be involved in discussions related to the entrepreneurship field. One study concluded that universities should provide education on entrepreneurship (Tong et al., 2011: 487). Another study concluded on the importance of providing entrepreneurial related courses or even programs to the technology for engineering students where the focus could be on technology entrepreneurship (Zhang et al., 2014:638). Todorovic et al., 2011(136) even developed a scale (ENTRE-U) in order to measure the Entrepreneurship Orientation (EO) of university departments.

Entrepreneurship and Higher Education

Gurol and Atsan (2006: 28) stated that literature review mainly revealed that that entrepreneurship intention of university students is defined by; need for achievement, locus of control, risk-taking propensity, tolerance for ambiguity, innovativeness and selfconfidence. Moreover they agreed that these characteristics are able also to define individuals' "entrepreneurial behavior" (Gurol & Atsan, 2006: 28). In addition, Tong et al., (2011: 487) in their study also Desire for Independence, Family Business Background, and Subjective Norms as factors determining the entrepreneurial intention of university students. (Kristiansen & Indarti, 2004: 63-64) in their study stated that entrepreneurial intention is affected by both demographic and individual background and personality. Pruett et al., (2009: 590) in their research stated that having in the family an individual who is entrepreneur does have a positive effect on the entrepreneurial intention of the university students. Altogether with the aforementioned antecedents of entrepreneurial intention Sesen (2013: 624) in his study added also Environmental factors, Access to capital, Business information (knowledge), Social networks, and University education. We do agree in this study with Sesen (2013: 624) that university education is important and has significant effect on entrepreneurial intention of university students.

Higher education institutions themselves have a crucial role in the economic ecosystem. Maintaining good relations with the industry not only is important to them since these relations have a significant impact on the steps and practices undertaken by the them (Mautner, 2005: 95)but also Higher institutions are among the main actors in preparing the new entrepreneurs by providing education in the field of entrepreneurship (Fayolle & Lyon, 2000: 172; Franke & Luthje, 2004: 269; Petridou et.al, 2009: 287).There are evidences from the United Kingdom (Galloway & Brown, 2002: 398) and Turkey (Gurol & Atsan, 2006: 25) regarding the importance of education on entrepreneurship (Bae et al., 2014: 234) but what is very interesting result is the one provided by Alvarez et al., (2015:399) who argue that there exist no major differences among entrepreneural curricula and content between universities.

There are different education and programmes for entrepreneurs which can be broadly classifies as follows (Henderson & Robertson, 1999: 237, 244):

- Programmes for small business start-ups
- Continuing (adult) small business education
- Small business education

Fayolle and Lyon (2000) consider the differences among societies and argue as follows: "American society is unquestionably more entrepreneurial than French society.



Nevertheless, it is our hypothesis that behavioral differences between recent university graduates in France and the United States are largely due to the lack of sufficient attention to entrepreneurship in the French educational system (p: 175)" Additionally, other studies also searched the differences of entrepreneurial intention among students from different cultures (Levenburg & Schwarz, 2008: 26-30); (Lee et al., 2006: 351). There exists a strong relation between entrepreneurial activity and entrepreneurial orientation (Lee et al., 2005: 31; Do Paço et al., 2011: 23). There are many scales developed to measure the entrepreneurial intention of university students and especially graduates or undergraduates from fields non related to business. As an example we would mention the Pharmacy Student Entrepreneurial Orientation scale developed by Hermansen-kobulnicky and Moss., (2004).

Data Collection, Methodology and Analysis

The aim of this study is to provide answers to the following questions related to the perception towards entrepreneurship and entrepreneurial intention by comparing the university students from two different departments:

- Do university students take risk?
- What are the perceived barriers of university students concerning entrepreneurship?
- Does the support from outside motivate them towards entrepreneurship?
- How do university students evaluate entrepreneurship?
- Is there any difference between entrepreneurship orientation between business informatics students and computer engineering students?

This study is an empirical research. For this research, survey method was chosen as data collection tool. The questionnaire of the research has been developed by taking advantage of scales whose validity and reliability have already proven. In this study has been used the scale developed by Luthje and Franke (2003). For the items it has been used the Likert scale requiring to rate them from 1. Not at all Accurate ... 5. Totally Accurate.

Given the literature review in the above parts, we stated that there are many components of entrepreneurship affecting the entrepreneurial intention of university students (Carland et al., 1984: 356; Gurol & Atsan, 2006: 28; Tong et al., 2011: 487). In this study, in order to measure entrepreneurial intention of university students and to answer our research questions we took advantage of the scale used by Luthje and Franke (2003) in their study. They defined a sample of 512 students at the MIT School of Engineering and used the questionnaire as a data collection tool. We have chosen this questionnaire since it was constructed after conducting "eight preliminary studies involving 139 subjects were conducted to develop valid scales for the constructs in the model questionnaire" (Luthje & Franke, 2003: 139). The items were taken originally and only some regulations to adapt to the sample were made. The scale used in this study is shown in the respective appendix. In their work Luthje and Franke (2003) analyzed the data by using the Structural Equation Modeling. They studied the perceptions toward entrepreneurship and the effect on entrepreneurship intention of a sample composed of 512 students from the MIT School of Engineering; a sample which confirmed their model. Their results show that altogether with personality of the individuals the barriers and the supporting factors also do affect the entrepreneurship intention. The items of the items included in the questionnaire measure the dimensions obtained by Luthje and Franke (2003) that are Risk taking propensity; Locus of control; Perceived barriers; Perceived support factors; Attitude towards entrepreneurship, and Entrepreneurial intent.



We have also included some demographic questions in the questionnaire which are as follows:

- Gender
- Department
- City
- Self-employability of the parents

Further, we have prepared the questionnaire to deliver to the students. The population of the study is composed of the students of Business Informatics Program at the Faculty of Economics and Administrative Sciences at Epoka University, and Computer Engineering students at the Faculty of Architecture and Engineering at Epoka University. The sample of the study and has been chosen by simply random sampling. We have decided on these thus taking as an example also previous researchers who considered in their works samples with technological background (phan et al., 2002: 157-158: Wang and Wong, 2004: 165-166).We asked from the Head of Business Informatics Program and from the Computer Engineering Program Coordinator to deliver the questionnaire to the students. The questionnaire was sent online via Google Forms¹.Questionnaire number filled by the students was 88. The number of questionnaires suitable to be included in the analyzing process was 76 or 86.34% of the collected questionnaires.

To analyze the data of this study SPSS 20 package has been used. In order to analyze the data of this study we have conducted One Way ANOVA. We have used it to define whether there are significant differences among different samples in a study. First of all the number of answered surveys was 88. From these, only 76 or 86.3% of them were included in the analysis process. From the demographic data we observed that 44.7% of participants were male whereas 55.3% were female. On the other hand, there is a slight difference between participants from the two departments. The demographic characteristics of the participants in the sample are presented at Table 1.

		f	%
Condon	Male	34	44,7
Gender	Female	42	55,3
Demontry and	Computer Engineering	39	51,3
Department	Business Informatics	37	48,7
Cite	Tirana	56	73,7
City	Other cities	20	26,3

Table 1: Demographic characteristics of the sample

From the mean comparison we found out that, there are some differences among the groups. Firstly, we may say that there is a slight difference in risk taking dimension. We found that females were more risk takers. The locus of control also is higher in females. This means that females have a higher degree of belief that they have control over the outcome of the events. As table 2 shows, females perceive more barriers to entrepreneurship than males. Also compared to males they perceive that support is higher too. Attitude towards entrepreneurship is higher in females but entrepreneurship orientation is higher in males.

¹The link of the form was:

https://docs.google.com/forms/d/e/1FAIpQLScGCCsmx8RRmDKoxmujuACpts_idTg7IGqIDq0462qIQbCRA/viewform_



The mean comparison according to departments revealed us that Business Informatics program students had higher risk taking mean. Locus of control in a very narrow difference was higher. Perceived barriers value is higher too. Attitude towards entrepreneurship was higher in Computer Engineering students whereas Entrepreneurship intention was higher at Business informatics students. Prior to interpret the data we are providing the results of One Way ANOVA.

Firstly when conducting One Way ANOVA we have to be sure that we have sufficient sample sizes in each independent variable. Since the aim of this study is to exploit entrepreneurship intention of students from two different programs, and define whether exists or not possible differences we have defined as independent variable the Business Informatics (BINF) and Computer Engineering (CEN) program. In order to confirm that we have sufficient amount of sample we have conducted frequency analysis. Since we have at least enough elements for each sample, we are confident to have at least valid Analysis of Variance.

		Frequency	Percent	Valid Percent	Cumulative
					Tercent
	CEN	39	51.3	51.3	51.3
Valid	BINF	37	48.7	48.7	100.0
	Total	76	100.0	100.0	

Table 2: Frequency table for BIN and CEN programs

According to the analysis of the data from mean comparison and One-Way ANOVA we would conclude that first of all there is no slight difference among the two departments. We would estimate that the reason for this is the sample number or the fact that the students of the two programs show somehow similar characteristics because they have a strong technological background, and they do not take any Entrepreneurship course.

Risk taking according to the analysis is at the same middle level for both groups. This shows as that both Computer Engineering and Business Informatics students are willing to take risk in a significant middle level. Locus of control on the other hand, is above the average and nearly similar to the two programs, which show a high self-esteem and determination for both of the student groups. Perceived barriers are higher for Business Informatics students even though One Way ANOVA analysis showed that this difference was not significant. We estimate that this is because they have some business related courses and are more oriented towards defining the barriers clearer than computer-engineering students define. This study revealed that the attitude towards entrepreneurship is high. Both groups perceive entrepreneurship positively but interestingly entrepreneurship intention was found to be lower that the attitude towards entrepreneurship. We would conclude that low entrepreneurship intention is low also because of the Albanian economic environment.

Further, we do relate this result to the fact that they are in a young age and they are more likely to be independent in their work. When it comes to the being self-employed after finishing the university, they do include their perceptions regarding Albanian business environment problems, which lowers the intention rate. Moreover, since they are not having any Entrepreneurship course in their curricula we would estimate that this is another fact that lowers their entrepreneurship intention.

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CONCLUSION AND RECOMMENDATIONS

This study to our knowledge is the first in its kind in Albania. Entrepreneurship intention on the other hand is a topic, which has been elaborated widely in literature, in different cultures and business environments via different works and empirical studies as our literature review has shown.

This study revealed that entrepreneurship is a field that should be backed by education. In this context this study have revealed that university students who has a technological background (computer engineering and business informatics students) should have entrepreneurship related courses in order to better define their path after graduation from the university. Furthermore, this study showed that there is no difference of the entrepreneurship intention among computer engineering and business informatics students. This study concluded that business informatics students and computer engineering bear similar characteristics towards entrepreneurship.

In the light of this study we would made some recommendations for both universities and industry. In particular this study and its recommendations would be important to Epoka University and Albanian industry.

- University should take in consideration to offer some entrepreneurship related courses to both programs.
- Business informatics program is already having business related courses but there must be an entrepreneurship related content.
- Computer engineering students should be given the possibility to have in their curricula entrepreneurship related course(s) related to their field.
- There should be incentives to enhance competitions related to entrepreneurship, and Start-Up competitions.
- In order to help students to raise the level of entrepreneurship intention the departments should cooperate with the industry by firstly define their problems and offering technological solutions in forms of trial.
- Given the raising trend of technology, we would suggest that companies should offer incubation programs for computer engineering and business informatics students.

This study has some limitations. Firstly, it is conducted in a private university. This fact may affect students since they have already parents who are included in entrepreneurial activities. The sample of the study is not big. Even though the number of the sample does not harm the validity of the study the sample of future researches, have to enhanced. Lastly, future studies should focus also on different aspects of university students (private vs. public; among different programs).

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Working Capital Management Problems Of The Enterprises Registered In Konya Ereğli Chamber Of Commerce And Solution Suggestions

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Abstract

The purpose of this study is; To identify the problems faced by the enterprises registered in Konya Ereğli Chamber of Commerce in the management of working capital and to propose solutions to these problems. For this purpose, data were collected from the 161 enterprises registered in the field by questionnaire method. The collected data were processed in SPSS packet program and frequency, factor and correlation analyzes were performed. The problem that the enterprises mostly live in the direction of the analyzes made; Collection of receivables and insecurity. In addition, the inadequacy of the education levels of the managers at various levels is another important problem.

Key words: Chamber of Commerce, Net Working Capital Management, SME

Main Conference Topic: Risk Management

INTRODUCTION

Current assets and short-term liabilities used in financing of these assets formthe working capital structure of enterprises. When we detail this general structure, the current assets are; cash and securities, stocks and receivables. In addition, short-term liabilities are; short-term bank loans and short-term commercial debts (Smith, 1979). Depending on its structure, the working capital is defined as liquidity management by many managers (Kolb, 1983).

The definition of working capital made by Smith is quite extensive and many different types of working capital for managers can emerge. It is possible to define total current assets as gross working capital and the portion obtained by subtracting short term debts from current assets as net working capital (Aksoy&Yalçıner,2013).

• Gross working capital: Total current assets

(1)

Net working capital: Total current assets – Short Term Debt Total (2)

The main commercial activities of the enterprises are the transformation of the cash to the commercial goods or raw material, to the product stock of the raw material, to the trade receiveables by selling the goods in stocks and finally to the enterprise with profit again by collecting the trade receiveables as shown in Figure-1 (Guthmann, 1968).



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This cycle basically consists of two cycles. The first is the cycle of goods in commercial activity and the second is the cash cycle in the commercial activity (Ercan&Ban, 2005: 278)



Figure-2: Activity and Cash Cycle

When the cycle specified in the enterprises is completed properly, the need for net working capital will be reduced to the lowest levels and the additional funding costs will be decreased.However, delays to be experienced in the process and other negativities will lead to additional funding costs, and capital costs will increase due to these additional funds. In addition, enterprises that can not manage the cash cycle properly will not be able to appreciate economic growth opportunities, or even risk their commercial reputation.

The research detailed below was carried out in cooperation with Konya Ereğli Chamber of Commerce in order to avoid the risks mentioned by the companies registered in Konya Ereğli Chamber of Commerce and to support their economic growth, and the results are presented in the report. In the first part of the report prepared, the methodology of the research and the analysis techniques used are explained. In the second part, the findings obtained in the direction of the analyzes made are presented systematically. In the third part, the evaluation and results of the findings obtained in the findings are discussed, and in the last part, solutions for the identified problems are presented.

METHODOLOGY

So as to investigate the working capital qualifications of the enterprises registered in Konya Ereğli Chamber of Commerce, a questionnaire study was conducted on 240 enterprises registered.161 enterprises contributed to the questionnaire, but other companies did not want to answer the questionnaire.

The Alpha Reliability Test has been applied to determine the reliability of the questionnaire conducted.Reliability test results, as shown in Table-1, were found to be reliable as the Cronbach Alpha value was above 0.521

Table-1: Reliability Test Results

Cronbach's Alpha	N of Items
,521	19

In addition, Kolmogorov-Simirnov Nonparametric Tests were conducted to measure the distribution of answers given in the questionnaire study.As a result of the tests made, it is understood that all variables show a non-parametric distribution. Correlation analysis method to be made based on this result is determined as Spearman Correlation Analysis.

In the questionnaire study, Factor Analysis was performed on the questions created according to the Likert scale, and the fitness of question groups for the purpose was tested.Table-2 shows the question groups and the relations between them.The questions created can be explained by 4 factors or clustered in 4 groups.

Source: Ercan ve Ban, 278

		Factors			
		1	2	3	4
Receivables and Payables	We have difficulty repaying commercial debts on time	,820	-,212	-,057	-,035
Management	We have difficulty in repaying debt installments that are on the bank	,773	-,128	,135	,208
	We have difficulty collecting receivables on time	,738	,127	,072	-,114
Working Capital	The assets shown as collateral are sufficient	,118	,718	,294	,079
Management Elements and	We can get credit in the desired wage	-,101	,713	,214	-,121
Results	We can make all our cash payments in a timely and convenient manner	-,332	,686	-,308	,055
	New ideas and growth opportunities can be evaluated by our business	-,040	,533	,006	,425
Fund Resources	Credits are usually short-term	,100	,003	,748	,107
	The fact that financial statements do not give confidence to the bank is an important question	-,005	,199	,700	-,061
Macro Problems in Working	Loan interest rates should be low	,220	-,065	-,085	,757
Capital Management	The state encourages the financing of small businesses	-,332	,161	,212	,619

Table-2: Factor Analysis Results

Frequency Analysis was performed to determine the factors affecting the working capital structures of the enterprises in the study area and the analysis results are explained in the findings section. In addition, Spearman Correlation Analysis was performed with the aim of determining the interaction between the factors affecting the working capital structure and the results are given in the findings.

FINDINGS

1- Frequency Analysis

The General Structure of Enterprises: It is seen that the activities of the enterprises registered in Konya Ereğli Chamber of Commerce are quite balanced.35% of these enterprises operate in trade, 24% in manufacturing, 20% in services and 19% in agriculture.Especially, the intensity of agricultural enterprises is remarkable. The reason for this is estimated as the height of the agricultural production capacity of the survey area.

83% of the registered enterprises are Limited Companies, 10% are private companies and 6% are Incorporated Companies. The limited companies that make up the majority of registered enterprises, depending on their legal structure, have limited access to national and international fund suppliers. Because, according to the legal structure of the limited company, they can not obtain low cost funds from the capital markets due to the problem of not being able to open to the public.

50% of the enterprises in the study area have been active for less than 10 years. Especially, the ratio of young enterprises with an activity period of 1-5 years has been determined as 23%. The ratio of these enterprises that need the most support in terms of working capital management is very important. In addition, 9% of the enterprises with more than 40 years of commercial life are very important in transferring the experiences.

When the size of enterprises is examined in terms of employee numbers, micro enterprises with a workforce of less than 10 constitute the largest group with 68%. The rate of enterprises with more than 50 employees was found to be 6%. According to these data, it is understood that enterprises in Ereğli, Konyaare mostly made up of micro enterprises.

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Chart-2: Operating Periods of Enterprises (Year)



Chart-3: Legal Structure of Enterprises



Chart-4: Number of Employees in Enterprises





Manager Profiles of Enterprises: The training of managers is quite essential in working capital management. In particular, training in financial management will significantly change the financial structures and funding diversity of enterprises. In 78% of the enterprises in the surveyed area, the owners of the enterprises are also the managers of the enterprises. Accordingly, a large part of the enterprises are made up of family enterprises. It is understood that 12% of the managers are also one of the enterprise partners. The ratio of professional managers in all enterprises was found to be 9%.

Chart-5: Manager Profiles of Enterprises



55% of the managers' education is at secondary and high school level, mainly due to the fact that the enterprises are mostly family businesses in Ereğli, Konya.The ratio of undergraduate and graduate education was found to be 41%.

Chart-6: The Managers' Level of Education



Reliable data are needed to be able to manage the working capital well. The acquisition of reliable data may be possible with the existence of accounting and finance departments working systematically. However, accounting and finance department is not present in 31% of the enterprises in the research area.

Chart-7: Presence of Accounting and Finance Department in the Enterprises



If the enterprises in the scope of research have separate financial departments, 72% of the managers have undergraduate and graduate level of education, which is quite different from the education level of business managers.




Working Capital Factors of the Enterprises: The most important factor affecting the working capital of the enterprises registered in Konya Ereğli Chamber of Commerce was determined as the collection problem. The maturity mismatch between trade debts and receivables is considered as the second most important factor. In addition, the reliability of bills receivable and checks is also the third important issue. It has been determined that the interest rates and stock keeping costs of the bank loans that the enterprises use in managing their working capital are not at a very important level.

Chart-8: The Most Important Factors of the Working Capital



Enterprises often receive funds from banks when they need funding in their working capital management, and it is understood that they also get funds from non-financial elements in the nearby environment as foreign assets.





52.53% of the registered companies in Konya Ereğli Chamber of Commerce reported that they have difficulty paying their commercial debts, 13.92% are undecided and 33.54% reported that they do not have any difficulty. 43.87% of the enterprises state that they do not have difficulty in paying debts to the banks while 47.74% of the enterprises report that they have difficulty. Relatively, enterprises have more difficulty in repaying their commercial debts than repaying their debts to the bank.It is understood that the main reason for the repayment difficulty of the debts is that 90,56% of the receivables can not be collected on time.

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		Absolutely	Agree	Neutral	Disagree	Strongly
		Agree	-	Agree	-	Disagree
		-		•		-
Difficulties	We have difficulty repaying commercial debts on time	23,42%	29,11%	13,92%	28,48%	5,06%
Difficulties	We have difficulty in repaying debt installments that					
	are on the bank	16,13%	31,61%	8,39%	30,32%	13,55%
	We have difficulty collecting receivables on time	57.23%	33.33%	1.89%	5.03%	2.52%
Qualifications	The assets shown as collateral are sufficient	30,14%	37,67%	17,81%	10,96%	3,42%
	We can get credit in the desired wage	17,88%	42,38%	13,25%	18,54%	7,95%
	We can make all our cash payments in a timely and					
	convenient manner	17,83%	36,31%	16,56%	24,20%	5,10%
	New ideas and growth opportunities can be evaluated					
	by our business	25,49%	41,18%	17,65%	11,76%	3,92%
Fund Resources	Credits are usually short-term	16,44%	47,26%	20,55%	10,27%	5,48%
	The fact that financial statements do not give					
	confidence to the bank is an important question	31,03%	34,48%	20,00%	10,34%	4,14%
Macro Problems in	Loan interest rates should be low	8,00%	10,00%	10,67%	31,33%	40,00%
Management	The state encourages the financing of small businesses	12,24%	18,37%	19,05%	23,81%	26,53%

Table-3: Frequency A	Analysis	Results	of Likert	Scale	Ouestions
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67.81% of the enterprises are considered to be adequate in their working capital qualifications. However, 17,81% of the enterprises are undecided in this respect. While enterprises generally think that they can find credits in the desired maturity, the rate of unstable and negative thinkers is also quite high.Moreover, it is understood that these loans are mainly obtained by the purpose of the management of the working capital, since the loans used by the enterprises are mostly short-termed.Another reason why credits are mostly short-term is identified to be the lack of confidence in the financial statements of the enterprises. Increasing the reliability of financial statements is understood to be one of the fundamental problems that can solve the identified funding issues.In the establishment of reliable financial statements, the importance of accounting and finance department within the structure of internal organization of enterprise comes out with this problem.The interest rates of the loans used by the enterprises within macro policies are mostly high.According to the enterprises, the support of the government to the SMEs can not be understood clearly, depending on the reliable distribution of the answers to the questions about government support.

2- **Correlation Analysis** A correlation analysis was conducted with the aim of determining the relationships

among the elements in the study area that are thought to be effective in managing the working capital. The results of the analysis are included in the Appendix-1 table.

No significant relationship was found between the operating periods of the enterprises and other variables. The following conclusions can be proposed, depending on the absence of a relationship between the operating period of the enterprises and other variables:

- The operating period of the enterprise does not affect the education of the business manager.
- The operating period of the enterprise does not affect the existence of accounting and finance department.
- The operating period of the enterprise does not affect the number of employees andthe period of activity does not affect employment in a positive way. In addition, no increase in the number of employees can be interpreted asnot being able to achieve the desired growth.
- Problems that may arise in the management of working capital are not related to the operating period of the enterprise. Whether it is a new business or a long-running business, it is experiencing the same problems in managing its working capital.

A positive relationship was found between the educational status of business managers and the presence of accounting and finance department, and the educational status of the employees in this department. As the level of education of business managers increases, the presence of accounting and finance department increases, and it is understood that the education level of employees in this department also increases. It can be said that the level of education of managers is very important in solving the problems that enterprises face in management of working capital.



It has been determined that there is a 99% reliability level relationship between the presence of the accounting and finance department and the number of employees in the enterprises. According to this finding, the presence of accounting and finance department depends not only on the level of education of managers but also on the number of employees who are in operation.

A positive relation was found at 95% reliability level between the education level of the financial manager of the business and the level of education of the business manager, the payment of commercial debts and the low perception of the bank loan interest rates. According to this:

- As the level of education of the manager increases, the education level of the finance manager also increases.
- As the level of finance manager's education increases, it is understood that the enterprise is less able to pay trade debts.
- As the education level of the financial manager increases, the interest rates on bank loans are not perceived as too high.

The number of employees in the enterprise affects a majority of the working capital management factors. The relationships identified are as follows:

- There is a relationship of 99% reliability level between the number of employees and area of activity. In particular, the number of employees operating in the manufacturing sector is higher than the number of employees in other enterprises.
- As the number of employees increases, the presence of accounting and finance department of enterprises increases.
- As the number of employees increases, they have less difficulty in paying their trade debts than others.
- As the number of employees increases, they have less difficulty in repaying their bank loans than others.
- As the number of employees increases, innovations become easier to adapt and growth opportunities can be appreciated better than in other enterprises.
- As the number of employees increases, it is easier for the employer to find credits in the desired maturity.
- Enterprises with a high number of employees are more concerned about the reliability of financial statements.
- Enterprises with a high number of employees think that the collaterals for loans are more adequate than other enterprises.
- Enterprises with a high number of employees think that the government's support for SMEs is better than other enterprises.

When the other factors affecting the collection, which is the most important element of the working capital management, were examined, it was understood that none of the variables subject to the research were effective. In sum, the operational area, size, level of education of managers and duration of operation are not influential on the collection problem of the enterprises. It can be said that the source of the collection problem is not caused by the internal dynamics of the enterprise but by external factors. These external factors are generally regarded as macroeconomic factors and it is not possible to find solutions with the internal policies of the enterprises. In order to solve macroeconomic problems in collections directly affect the working capital. Especially, it is supported that we find a very high relation between collection and trade debts and bank loans payments in the range of 99% reliability between collections and trade debts and bank loans payments. As the collection problem increases, repayment of commercial debts and bank loans becomes difficult. In addition, enterprises having collection problems accept that the government gives low support for SMEs and they are looking for different solutions.

In the problem of payment of debts, although the source of the problem in commercial debts and bank loans repayments is common, the results are dissimilar. Enterprises struggling to pay commercial debts state that they are not able to appreciate new ideas and growth opportunities, and the government support is not enough, while the others having difficulties in repaying their banks loans report that they have not experienced these problems.



Enterprises that can make their payments on time indicate that they can appreciate growth opportunities, receive credits in the desired maturity, that their collateral is sufficient and that the government support is also sufficient.

It is understood that the operation area of the enterprise, the number of employees, the ability to make payments on time, the adequacy of the collections and receiving credits in the desired maturity are effective in capturing the opportunity of appreciation of new ideas (innovation), which is an important element in the growth of enterprises and in the increase of the contribution they will provide to macro economics. As enterprises become more comfortable managing their working capital, their efforts to innovate and create value-added products are increasing.

Another important issue for working capital management is the availability of short term loans. There is a positive high level relationship in the range of 99% reliability between the availability of short term credits and the reliability of financial statements and the adequacy of collaterals. Based on this determination, the reliability of the financial statements of the enterprises and the level of collateral they provide increase the short term credit availability.

CONCLUSION

As a result, in the management of the working capital of the enterprises registered in Konya Eregli Chamber of Commerce:

- The most important problem of cash conversion is the problem of trust in the collection of the receivables and credit sales.
- In order to achieve cash conversion, foreign resources are needed and there is a need for accounting and finance department consisting of educated persons who prepare proper financial reports for fund management.
- In addition, the level of education of business managers needs to be upgraded to ensure professional management.

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A Project Proposal For Creating A Data Bank In Turkish Agriculture

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Abstract

The purpose of this study is to enable farmers to produce reliable data and transform agricultural businesses into legal entities by removing them from real person businesses to create understandable and manageable reports by the stakeholders.For this purpose, the farmers' declarations and the data they do not express are gathered and the methods of forming the opening balances by considering each farm as a legal personality will be investigated. When a successful method is created, a software linked to the governance will be created and the opening balances of the farmers in the pilot region will be prepared first, and if success is achieved, it will be spread all over Turkey.The primary purpose of the project is to establish the opening balances of agricultural enterprises.The second purpose is to create simulations to form the most appropriate structure to ensure coordination between the Directorate of Agriculture, Chambers of Agriculture and SMMM to ensure the continuity of this system.

Keywords: Turkish Agriculture, Data Bank, Project Proposal

Main Conference Topic: Natural sciences and business

INTRODUCTION

The agriculture sector is basically confronted as the basic sector in terms of raw material supply of food supply and other industrial groups. The agricultural sector's benefit stakeholders need regular, consistent and reliable knowledge to manage the industry properly. Despite the importance of the agricultural sector, data as intense as other sectors can not be produced. The reason for this is that other elements of the sector have a highly organized accounting structure. Depending on this structure, permanent and regular data are transferred to the public. However, since agricultural sector enterprises are mostly individuals and family businesses, accounting records are not kept, and when public data is requested, inconsistent and intermittent data are declared. In addition, these declarations are rather scattered, difficult to reach, understand, and compare by subject stakeholders.

There is a need for intensive statistical data for the measurement, planning, support and restructuring of agricultural activities in Turkey. Today, the required data are collected and reported by ASIMIS (Agricultural Sector Integrated Management Information System). An important part of ASIMIS's data network is the Directorate of Agriculture which is organized in provincial organizations.Due to the increase in work intensity of the Directorates of Agriculture, no reliable data can be collected.In addition, the FADN (Farm Accountancy Data Network) implemented within the EU in the direction of the EU (European Union)



agriculture and rural development has also started to be implemented in Turkey; however, the system is not a general accounting network, but a system designed to make economic analysis of the main mass, depending on the statistical significance of the sample mass.However, it would be a more correct approach for the farmers operating in Turkey to register their accounts and to present the data instantaneously in the formulation of agricultural policies.

LITERATURE

The EU (1965) standardized the keeping of accounting records of these enterprises in order to classify and manage agricultural enterprises in the first place in the development of the EU CAP (Common Agricultural Policy). For this purpose, in 1965, the structure of the Farm Accountancy Data Network (FADN) was decided by the EU Commission. However, the EU did not oblige all agricultural holdings to keep an accounting record, but received accounting data by sampling from within agricultural businesses that only meet certain criteria.By generalizing the data obtained from the sample mass, it developed strategies for CAP.

In his study, Cengiz ERDAMAR (1974) shows the classification of enterprises in the agriculture sector and what the economic sizes within the determined classes are within the specified date. In the study, he argues that the accounting system should be taught to farmers in order to ensure the healthy management of agricultural enterprises. On agricultural accounting, he suggests that Ziraat Bank should organize agricultural associations and cooperatives.

Göktolga and Karacier (1999) examined the agricultural accounting data network (FADN) implemented within the EU and argued that agricultural policies could not be properly managed because this system was not in Turkey. He suggested that Turkey should establish a FADN-like system immediately.

TASB (2006) Turkish Accounting Standards Board issued TAS (Turkish Accounting Standards) in accordance with international developments and published TAS 41 standard in accordance with sector specific structure.

Murat ARSLAN (2008) examined the applicability of the FADN (Farm Accounting Data Network) system in Turkey, which is the counterpart of the FADN system used in the EU.In this study, attention has been drawn to the problem of choosing the sample mass very carefully in order to reach the information which is important in agriculture policies.Depending on the lack of statistical studies on the sampling, the sample was determined based on the mass professional opinion in 2008. Accordingly, the incoming data reveal the problem of general representation. Arslan suggests that sample mass selection should be made by private professional firms, not by the state.

In his work, Cihan NAZLI (2008) examined the sub-structure of the FADN system which has been started in Turkey and determined that it is necessary to reach the required data and to have great economical and human resources for the continuity of FADN system. The fact that agricultural enterprises in Turkey do not have the habit of recording accounting in the direction of tax structure, the lack of organization to collect data, the lack of specialization of the data collectors, and the costs are mentioned as the biggest dilemmas of the system. In order to overcome these problems, he recommends that the Ministry should establish a special organization for FADN and that other organizations should be included in this



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organization. It is also suggested that various incentive systems should be developed to encourage farmers to keep accounting records.

Tokay and Deran stated in their studies on cost management of fruit gardens (in 2011) that accounting system in agricultural enterprises is very important for management and they have created a special income table for agricultural enterprises.

Hacı Arif TUNÇEZ (2011) states in his doctoral thesis that agricultural enterprises do not keep accounting records because of tax avoidance but those unregistered accounting records constitute major problems in terms of business management and agricultural policies. He also suggests that the Uniform Accounting system in agriculture accounting is advantageous over other systems.

Yusuf ÇELİK (2014) compares the systems of "Laur, FADN and Uniform Accounting System" which are three different accounting systems developed for agricultural enterprises. He states that the Laur system is beneficial only for econometric studies, and the FADNsystemin the policy development of the Ministry of Food, Agriculture and Livestock and the Uniform Accounting system in terms of taxation, but he also suggests that it is possible and necessary to harmonize these three systems.

Agricultural Sector Integrated Management Information System (ASIMIS) is a sub-unit of the Ministry of Food, Agriculture and Livestock that collects, regulates and reports all data relevant to the agricultural sector. In accordance with this structure, the coordination of FADN system for this structure belongs to ASIMIS.ASIMIS has received data from 6,000 farmers in 2015, starting with 367 farmers in 2008. The aim of FADN is to produce the necessary statistical data in order to develop the agriculture policy strategies. Farmers involved in the system provide data on a voluntary basis. The accounting records realized do not have a tax value and the data are not shared with the Ministry of Finance. The enterprises included in the system also receive incentive payments that increase over the years. In the collection of the data, statistical methods are used to determine the sample mass and the data are processed to produce statistically meaningful reports about the main mass.Until 2013, there may not be a complete representation of the results obtained as the system organization may not be fully formed and there is no statistical sampling plan. However, the representation problem is supposed to be resolved as the statistical sampling plan has been established since 2014. In 2015, a new software has been created for FADN and accounting records are planned to be realized through this software.

The importance of the agricultural accounting system is great for the agricultural sector to be properly managed in the direction of the studies given in the literature section. It is understood that this importance is put forward in the studies made and that the EU and Turkey have started to work for agricultural accountancy. Agricultural accounting is carried out through sample survey in FADN project organized by ASIMIS. This is the case:

- Agricultural enterprises in Turkey are quite small and have diverse structures. The problem of the generated sample mass not being able to represent the population arises.

- The generated data only provide information on the macroeconomic structure and can not be used by other stakeholders of the agricultural sector.

- The current structure of FADN gives excessive intensity to the provincial organization of the Ministry of Food, Agriculture and Livestock.



Each farmer shall be classified according to their size in accordance with the determined criteria in the pilot region determined within the scope of the planned project and the opening balance shall be arranged so that the desired sized farms can be considered as an appropriate legal entity (company) structure and accounting records can be made on the basis of the balance sheet. The declarations of the present farmers will be benefited while arranging the opening balance. These statements are scattered throughout various institutions of the state. The most difficult part of the work is the data collection and assembling phase. To be able to collect data from different institutions of the state (Mernis, Police Office, Land Office, etc.) and the security of these data are important elements in the study.

In the direction of the project, how the IAFAs (Independent Accountant and Financial Advisor) can be involved in the system will be investigated in order to get legal structure and to provide timely and truthful information to the users of the accounting information system.

The expected target in the project is to introduce software that will make the FADN (Farm Accounting Data Network) structure effective.

The agricultural sector has critical importance because it is the raw material supplier of food and other sectors.Governments are also aware of this and are constantly supporting the agriculture sector and want to make sure that they are properly managed.Regardless of whether it is a sector or a company, there is a need for accurate, regular and constant knowledge to be managed properly.The department that this information that the management needs is collected, arranged and reported is the accounting and finance department.Reliable accounting records are needed for management to make sound decisions.In this direction, accounting records are needed in support and orientation of the agricultural sector.Due to the fact that the unilateral accounting record holdings of farms with legal personality are compulsory according to TPL (Tax Procedure Law), there are regular accounting records of large farming enterprises.However, the number of agricultural enterprises in Turkey are small family businesses.

Small farming enterprises do not keep accounting records in line with the following reasons:

- 1 Small farming enterprises are generally family businesses and do not have knowledge of professional farming management.
- 2 Agricultural accounting has a very complex structure in terms of farmers.
- 3 Because small agricultural enterprises are supported by the state with various tax incentives, keeping highly complicated accounting records is considered unnecessary by the farmer.
- 4 In commercial enterprises, the accounting registration system is directed by various compulsory and supporting institutions (Chamber of Commerce, Chamber of Tradesmen and Craftsmen), Ministry of Finance and IAFA (Independent Accountant and Financial Advisor). However, there is no similar infrastructure for agricultural accounting.
- 5 The continuity of the agricultural account (in terms of distance and time to the city center) is expensive and troublesome.
- 6 Many national and international studies have been made on the subject. These studies reveal the necessity of agricultural accounting and indicate which methods should be followed. The studies carried out are presented chronologically below.



If the agricultural sector is managed like other enterprises, agricultural enterprises should be classified first, agricultural enterprises should be classified as legal entities and accounting methods appropriate for each agricultural enterprise should be established. In this respect, it will not be appropriate for some enterprises to remain in the accounting system and to leave some agricultural enterprises out of the system. It will be very difficult for the stakeholders of the sector to decide on any matter since agricultural enterprises outside the system will be out of the register. In this context, if the scope of the project is mainly achieved in the pilot region to be determined, all agricultural enterprises in Turkey are tergeted to be included in the system.

PHASES OF THE PROJECT

1 Classification of agricultural enterprises within the designated pilot region: Economic activity and income and corporation tax structures play an active role in the classification of enterprises. In classification of agricultural enterprises according to economic activities, FADN is used in EU and ESU unit is used in Turkey according to FADN structure. The ESU unit is based on the economic size of agricultural enterprise divided by a fixed number determined by the EU Commission. According to this, enterprises are classified as very small, small, medium, large and very large. In addition, the tax system is an important structure in the classification of agricultural enterprises. Agricultural enterprises earn a taxpayer status as long as they are defined as an enterprise and earn income. In this context, according to TPL in Turkey, it is necessary to classify the enterprises by using the TTA, BK, ITL sub-structure.

2 Transformation of each agricultural enterprise into legal personality by investigating legal personality structures in accordance with agricultural enterprises: In Turkey, only enterprises with TTA hold accounting records, and no matter how large the other enterprises are, they do not keep accounting records due to tax avoidance and state tax incentives. Correspondingly, the desired data about agriculture can not be reached.

When the classification of agricultural enterprises is realized as mentioned in the first phase, only the agricultural enterprises other than agriculture which can not provide subsistence with basic agriculture activities will be provided with appropriate business and accounting registration system according to TTA and BK.

3 Identification of data sources for the preparation of opening balances of agricultural entities created: the current assets and the fixed assets of agricultural enterprises are separated from the structures of commercial enterprises. The reason for this is that a significant part of the assets of agricultural enterprises are composed of plant and animal assets. For this purpose, TAS issued the accounting reporting standard numbered 41. It is also aimed that the farmer will be involved as little as possible in this process by investigating where the other assets in the balance sheet items and the data of the sources can be found most accurately.

4 Conclusion of agreements to receive data from public institutions in selected pilot regions in the direction of data sources: It is important to prepare the opening balances of agricultural enterprises that have gained legal personality. Business owners may not declare **current assets, fixed assets, short-term debts, long-term debts and equity** truthfully for various reasons.Instead, it is planned that the data that should be in the opening balance within the project will be based on the declarations made earlier by the farmer for different reasons.Accordingly, the necessary permissions and agreements will be made in the direction of the project to collect the data that the farmers give to the Agricultural Directorates,



Agricultural Chambers, Security Directorates, Land Registry and Cadastre Directorates and Ziraat Bank. If the necessary agreements can not be made, agreements with ASIMIS will have to be made in order to be able to obtain the data that ASIMIS sub-structure can reach.

5 Establishing the opening balances of the agricultural legal entities in the pilot region with a software to be developed if the data can be obtained regularly: How to prepare the computer software that automatically performs opening balances of the agricultural enterprises and how to integrate them into the FADN package program if necessary and how to make arrangements on the FADN program will be investigated as necessary and the opening balances of agricultural enterprises will be prepared.

6 Designing a system that will provide coordination of IAFAs, Agricultural Chambers and Agriculture Directorates for the success of the uniform accounting system: The preparation of opening balances constitutes the first part of the project. The second part is the continuity of the system. The continuity of the system is more important than the first part in terms of the success of the project. The system should produce continuous and reliable data rather than a one-time report. In this context, it is necessary to coordinate a substructure similar to that of the commercial enterprises for the continuity of the system. In the commercial enterprises, the accounting records are carried out by IAFAs, the tax offices are supervising the generated reports, and the chambers are coordinating. How agricultural enterprises can reach a similar structure will be investigated in this phase and necessary proposals will be presented to ASIMIS and the Ministry of Food, Agriculture and Livestock.

7 Examination of the resulting data, determination and resolution of the source of faults: A coordination structure will be established to eliminate faults and deficiencies that may occur in a pilot region designated by the system.Problems arising from the system will be solved by this coordination structure.

8 Generalization of the application to the whole of Turkey in case of success in the pilot region: The experience gained with the termination of the project will be shared with the necessary institutions in case of dissemination to all of Turkey and the digitized reports of the costs and benefits to be obtained will be presented.

CONCLUSION:

If the project is successful, the expected results are as follows:

- By turning each agricultural operation into a legal personality, it will be able to record the statements that are presented to the public with a single order accounting system and to create reports that every stakeholder can understand.
- The separately declared data will be collected in one place and will enable the Turkish agricultural sector to be managed more accurately.
- The proposed structure will solve the representation problem of the FADN system because it includes all agricultural enterprises.
- The informal economy will decline as the tax and incentive policies of the public will be better manageable.
- As the IAFAs are used more effectively in collecting the data, the work load of the provincial organization of the Ministry of Food, Agriculture and Livestock will be reduced and the records will be collected by the specialists.
- The existing agriculture enterprises within the project will have a more institutional



structure as the agriculture enterprises will be transformed into the enterprises of legal entities. In addition, the agricultural land shrinking by means of inheritance will not shrink anymore, and the heirs will be entitled to the rights of the legal entity, not the land.

- The structure to be improved within the project and the manipulations in the field of agriculture and food will be determined instantaneously and food safety will be ensured.

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Multidisciplinary Academic Conference

An Investigation of the Effects of the Analyst's Frame of Reference and Representation Forms on the Identification of Information Systems Development Problems

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Abstract

The objective of this research is to investigate the effects of system analysts' frames of reference and their use of different types of representation forms on the problem identification and information search behavior. The frame of reference was classified as three categories: technical, socio-technical, social, and an individual's frame of reference was identified using the sorting task. Two types of representation forms were employed to test hypotheses: technical and socio-technical. Little empirical evidence was available that examined the effect of frames of reference on problem identification and information search behavior. However, the representation forms were identified as influencing final problem identification.

Keywords: systems development, frame of reference, representation forms, problem identification, IS methodology

Main Conference Topic: Management, Technology and Innovation Management

Introduction

Ever since the introduction of the first business computer system in the early 1950s, information systems (IS) failures and their antecedent causes have continued to be reported in the literature (Cecez-Kecmanovic et al, 2014; Dwivedi et al, 2015; Ewusi-Mensah & Przasnyski, 1991; Lyytinen & Hirschheim, 1987; McBride, 2016; Nelson, 2007). A number of researchers suggest that lack of attention to socio-organizational issues may often be the cause of these IS disasters (Bostrom & Heinen, 1977; Cecez-Kecmanovic et al, 2014; Dwivedi et al, 2015; Hirschheim & Klein, 1989). Such behavioral reasons for IS failures suggest that, in order to provide socially acceptable as well as functionally complete systems, socio-organizational issues should be given the same attention as techno-economic issues during systems development (Bostrom & Heinen, 1977; Kumar & Wood-Harper, 1987). When these problems are left unresolved, the information system may be faced with unanticipated social and organizational problems, leading to IS failures.

Although Bostrom and Heinen (1977) suggested that neither techno-economic nor socio-organizational considerations can be ignored during system development, and systems analysts, in order to achieve the potential benefits of the IS and successfully accomplish its objectives, must possess a balanced view of the social and organizational, as well as technical aspects of information systems development, however, as reported by many authors(Dwivedi et al, 2015), a balanced analysis of social and technical aspects is usually much less common



in practice than a biased emphasis on technical and economical aspects. In the current practice, overly technical, rational, and economic issues are still dominant, and they easily overwhelm the consideration of social, political, and behavioral issues (Cecez-Kecmanovic et al, 2014; Dwivedi et al, 2015; Kumar & Wood-Harper, 1987). Critical behavioral impacts of the information systems on the organization and its users have often been overlooked during information systems development. Thus, the major motivation of this research is the investigation for the reasons for this inadequate attention to social and organizational issues during the typical development process.

Kumar and Bjorn-Anderson (1990) suggested that the inadequate attention to social problems and issues by the analyst could originate from the analysts' limited problem perception. This research explores two factors which previous research suggested as influencing the analysts' problem perception processes: the analyst's frame of reference and the representation forms used in understanding and modeling the problem situation.

Analysts' Frame of Reference

Fiske and Taylor (1984) define frame of reference as a "cognitive structure that represents organized knowledge about a given concept or type of stimulus" (p. 140). The unbalanced emphasis on technical problems and consequent inattention to social issues can be attributed to the analyst's cognitive structure (Hogarth, 1980; Newell & Simon, 1972; Sage, 1981). This cognitive structure provides the "frame of reference" within which the analyst analyzes the system (Bostrom & Heinen, 1977). A number of studies in cognitive psychology suggest that the cognitive information processing structure which exists in the human mind could largely cause a lack of attention to certain issues thereby creating a limited viewpoint of the problem situation (Dearborn & Simon, 1958; Hogarth, 1980; Stagner, 1969). Bostrom and Heinen (1977) suggest that the current social problems in IS development also originate from the analysts' frames of reference.

Research Model and Hypotheses

Research Model

The proposed research model describing the role of the analyst's frames of reference and the representation forms in search for additional information and IS problem identification is shown in Figure 1.



Figure 1: Research hypotheses

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Research Hypotheses

The frames of reference are thought to guide further information retrieval and search (Cantor & Mischel, 1977; Ross & Sicoly, 1979; Walsh, 1988). Analysts are more likely to seek additional information in a manner consistent with their frames of reference. The broader the frame of reference is, the greater is the variety of further information that is sought and used in systems analysis.

Hypothesis 1: The analyst's frames of reference influence his/ her search for additional information.

Similarly, the representations also guide the analysts' information search and also direct further information inquiry. Analysts are more likely to seek additional information and investigate those aspects of the problem which are consistent with the contents of the representation forms currently used. The relation between the representations and the aspects further searched is examined by hypothesis 2.

Hypothesis 2: The types of representation forms used influence the search for additional information.

Problem identification can be affected by the frame of reference because the frame of reference would guide the cognitive process which leads the final problem identification.

Hypothesis 3: The analyst's frames of reference influence the final problem identification by the analyst.

Representation forms also influence further problem identification processes because the analyst may already recognize and remember such problem aspects when he or she is given a "complete" representation form where relevant problem aspects are clearly shown. Therefore, a socio-technical representation would provide a greater likelihood of identifying social problems as compared to a purely technical representation form.

Hypothesis 4: The types of representation forms used influence the final problem identification.

Information additionally obtained may modify and change the initial problem identification. Smith (1989) reports that a significant relationship exist between the information additionally obtained and the final problem identification. He noted that those decision makers who initially failed to recognize the key issues were able to later realize their importance as a result of selecting additional information. Smith also reports that none of his subjects were able to identify the key problem without having obtained the additional critical information. Thus, the following hypothesis is proposed.

Hypothesis 5: The search for additional information influences the final problem identification.

Research methodology

Software Used in the Experiment

In order to avoid possible experimenter bias, and to develop consistency in administrating repeated experiments, software was developed to replace the researcher in conducting the experiment. The software was designed to drive the experiment to the end, thus making interactions between the experimenter and the subjects unnecessary. It consisted of such functions as showing the subjects how to draw the representation forms, to ask the subjects questions, and to save the typed answers of the subjects. All the subjects' actions, including typed answers, tasks completed, and task completion time were recorded by the software.



Experimental Case

An experimental case was developed which illustrated how a sales management information system (SMIS) was implemented in a wholesale company of chemical products. The Chemical U.S.A. case was designed to include both technical and social issues arising during the implementation of a computer-based information system.

Information Module Set

The initial case description was supported by additional information modules. Once the subjects had reviewed the initial case materials, developed the required representation forms, the software presented them with a set of modules as additional information. The subjects were asked to select the five most useful modules from this set. Fourteen information modules which further described the SMIS problems were prepared. These modules provided information for the "search for additional information." Each of these modules expanded upon the individual problems described in the experimental case. There were seven technical and seven social modules respectively.

Administration of the Experiment

Subjects

Seventy subjects participated as volunteers in the experiment. Table 1 summarizes the demographic profiles of participants collected from their background questionnaires.

Category		Number	Percent	
Major	Computer Science MIS or CIS	36 34	51 % 49 %	
Sex	Male Female	46 24	66 % 34 %	

Table	1:	The	profiles	of the	subjects
			I ./	./	./

Experimental Tasks

Each student was given a randomly ordered deck of 46 three-by-five inch cards. Each card was labeled with one of 46 factors related to the success of information systems. This set of 46 factors was drawn from previous IS satisfaction and key issue studies. The students were instructed to sort through the deck of cards to create two piles. One containing the factors that they thought were important to IS success and the other containing factors they thought relatively unimportant to success. Next, the students were instructed to look through their pile of important factors and sort it into smaller stacks of related factors, creating as many piles as they desired. They were then asked to rank the stacks in terms of the importance of the sets of related factors.

Main Experiment

After the subjects read the case, they performed four major tasks in the following sequence:

1. Drawing the representation form(s).

2. Search for additional information (additionally obtained information by selecting information modules).

3. Final problem identification.

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Experiment Results

Hypothesis 1

Frames of	N	Mean	Sum of	Mean	Z	<i>p</i> -value	
reference			scores	score			
Technical	17	-0.06	346.5	20.38	0.04	0.4829	
Social	23	0.04	473.5	20.59			

Table 2: T-test results on the search for additional information

The analysts with a technical frame of reference scored -0.06 and the analysts with a social frame of reference scored 0.04, on average, in the search for additional information. As the p-value 0.4829 suggests in Table 2, it appears that the analysts with a social frame of reference did not search for more social information. Thus, hypothesis 1a is not supported.

Table 3: Mann-Whitney U-test results on the search for additional information

Frames of	Ν	Mean	Sum of	Mean	Ζ	<i>p</i> -value	
reference			scores	score			
Technical	17	-0.06	394.0	23.18	0.31	0.3792	
Socio-technical	30	0.33	734.0	24.27			

As reported in Table 3, the analysts with a technical frame of reference scored -0.06 while the analysts with a socio-technical frame of reference scored 0.33 in the search for additional information.

Hypothesis 2

Representation forms	Number of scores	Sum of score	Mean
Technical Socio-technical	35 35	1177.0 1308.0	33.63 37.37
	Z score PROB > Z	0.7867 0.2157	

Table 4: Mann-Whitney test results on the search for additional information

The Z score 0.7867 provided a p-value 0.2157. Thus, the differences between the use of technical and socio-technical representation forms in search for additional information were not significant.

Hypothesis 3

				-		
Frames of reference	Ν	Final problem identification	s.d.	t	<i>p</i> -value	
Technical Social	17 23	-1.47 1.13	6.84 7.02	1.17	0.1245	

Table 5: T-test results on the final problem identification

The analysts with technical frames of reference scored -1.43 while the analysts with technical frames of reference scored 1.13 in the final problem identification. However, differences between these analysts are not significant at the 10% significance level. Thus, hypothesis 3a is not supported by the results.

Frames of reference	Ν	Final problem identification	s.d.	t	<i>p</i> -value	
Technical	17	-1.47	6.84	1.46	0.0753*	
Socio-technical	30	1.87	7.88			

Table 6: T-test results on the final problem identification

Indicates significance at the 10% significance level

The analysts with a technical frame of reference scored -1.47 and the analysts with a socio-technical frame of reference scored 1.87 in the final problem identification. The results of the t-test in Table 6 indicate that the analysts with socio-technical frames of reference finally identified more social problems than the analysts with technical frames of reference. The difference was significant at the 10% significance level (p-value=0.0753).

Hypothesis 4

Representation forms	Sum of observations	Mean scores	score	
Technical Socio-technical	35 35 Z score PROB > Z	907.0 1578.0 3.9573 $< 0.0001^{***}$	25.91 45.09	

*** Indicates significance at the 1% level

The p-value which is less than 0.0001 as shown in Table 7 indicates that the analysts with a socio-technical representation form may finally identify more social problems than the analysts with a technical representation form. Therefore, hypothesis 4 is strongly supported by the empirical data.

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Hypothesis 5

				-	
Search for	Ν	Final problem	s.d.	t	<i>p</i> -value
additional information		identification			
Technical	15	-4.40	6.97	3.26	0.0014^{***}
Social	16	4.56	8.22		

Table 8: T-test results on the final problem identification

*** Indicates a significance at the 1% significance level

The p-value 0.0014 is shown in Table 8 and thus the result is highly significant. The ttest results in Table 8 imply that the analysts who searched for more social problems may finally identify more social information than the analysts who searched for more technical problems.

Conclusion

This research, by examining the relative strengths of the effects of frames of reference and representation forms, suggests that frames of reference may play only a small and sometimes not very significant role in problem perception. Instead, it suggests that it may be much more productive to investigate the relatively larger and significant effects of the representation forms used in the analysis process. Thus, by suggesting avenues for redirecting research efforts, it contributes back to the reference disciplines of information systems.

Next, from an information systems research perspective, currently only minimal empirical evidence exists on the antecedents of problem identification and information search behavior during the systems analysis phase. This research, by importing theory from reference disciplines such as cognitive psychology and management, develops a theoretical underpinning for information systems analysis. It further develops a process model which relates the initial problem identification to additional information search behavior and consequent problem refinement and the identification of final problems. By providing a rigorous test of this theoretical model, this research contributes to the understanding of both the antecedents and the process of systems analysis.

From a practice perspective, the results of this research provide some very strong recommendations. The traditional assumption that the analysts' overly technical frames of reference may be the primary cause of the lack of attention to socio-organizational issues has lead both IS researchers and enlightened practitioners to device and suggest various alternatives for modifying these frames of reference. Article and textbooks routinely exhort educators to educate and sensitize budding systems analysts in socio-organizational concerns. As recently as this year, an article by Friedman and Kahn (1994) suggests computer scientists be educated to understand linkages between the social and technical perspectives. They argue that computer "science education should not drive a wedge between the social and the technical, but rather link both throughout the formal and informal curriculum" (p. 69) as offering several activities to integrate social with traditional technical issues in the classroom. Similarly, in an attempt to overcome the technical biases of the systems analysts, IS managers are regularly asked to institute training programs and reward systems which would induce the analyst to include socio-organizational issues in his analysis process.



At best, these efforts to modify the analysts' frame of reference can only be long-term and gradual. On the other hand, the strong influence of representation forms on problem identification and information search reported in this research suggests a much more effective and immediate remedy. By incorporating social representation forms in the information systems development methodologies, and by prescribing their use during systems analysis practitioners can easily ensure that socio-organizational issues will be given adequate attention during problem identification and information search. Furthermore, repeated use of these representation forms, through context learning (Welke, 1980) will, over time, also be instrumental in modifying the analysts' frames of reference. Thus, the incorporation of social representation forms in the IS development methodologies should provide a relatively inexpensive, quick, effective, and relatively painless method of achieving what practitioners and educators have been attempting do through exhortation, education, training, and modified reward systems.

Finally, the research results carry a strong warning for the practitioner. The observation that the use of primarily technical representation forms crowd out whatever small influence social and socio-technical frames of reference may have on the identification of social problems, suggests the dangers of using only technical representations of the systems. This caveat is also supported by earlier research on the use of "incomplete" representations which suggested that such representations by focusing the decision-makers attention on limited problem aspects may actually harm decision performance.

<References will be available upon request>

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He is currently Professor at the Business School of Sungkyunkwan University in Korea. He received his Ph.D. in Management Information Systems from Georgia State University. His research focuses on the area of knowledge transfer in IT project, online consumer behavior, SNS addiction. His papers have been published in European Journal of Information Systems, Information Systems Journal, and Computers in Human Behavior.



Mobile Commerce Innovation In The Retail Industry: A Case Of Bahrain

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Abstract

The emergence of Mobile Technologies has created a new innovation for retail companies by increasing the availability, frequency, and speed of communication between the company and their customers. Mobile commerce is likely to make a strong influence on business activities, consumer behavior, as well as national and global markets. Mobile applications are tools for accessing the Internet and for buying products and services. In this paper, the main aim is to demonstrate that with a mobile application and with better interaction features, retailing could be more entertainment. The main goal of this research is to review the latest trends in mobile commerce applications and to develop an Android-based mobile application "E-Grocery" to help residents in Bahrain do shopping for groceries in just few minutes. This paper also examines the scale and the cause of the use of smartphones by customers in traditional retailing. In the paper the survey results have been presented, which had been conducted among Smartphone users in Bahrain. The research results show that cell telephony while shopping has yet to reach the same level of popularity among Bahraini customers, which it has attained in other countries.

Keywords: Mobile Technology, Innovation, Mobile Commerce, Mobile Applications **Conference Topic:** Technology and Innovation Management

Introduction

The internet has changed many aspects of society, from business to recreation, from culture to communication and technology, as well as shopping and travelling. This new form of communication has provided new ways of doing business with the help of technological development. E-commerce is the new way of shopping and doing business. Technology has allowed companies to promote and sell their products on new markets, overcoming geographical borders as never before. Consumers have access to a wider market of products when they use wireless and internet technologies. Mobile devices with wide access to the Internet have allowed companies to reach consumers in more diverse ways, thus ensuring deep market penetration.

Consumers are increasingly using their mobile devices to bridge the online and offline worlds. Shoppers are using smartphones to look up product information, run price comparisons and even make online purchases while window shopping on a high street or in a store. In many cases, consumers are using bricks and mortar retailers as showrooms to evaluate products that they then buy from online retailers. In response, some bricks and mortar retailers are beginning to use mobile technologies and services to meld their online and physical properties into a distinctive consumer proposition that seeks to combine the strengths of e-commerce and traditional shopping. In many cases, these retailers are looking to use a combination of mobile and contactless technologies (NFC, QR codes and



other innovative technologies) to enable: Engagement with their consumers in and out of store. For example, through the delivery of relevant and timely offers to consumers' mobile phones; an interactive in store experience using NFC-enabled kiosks, posters, signage and other informational tools that can engage the consumer without distracting them from shopping; Straightforward payment, coupon redemption and accumulation of loyalty points at the point-of-sale. The goal is to give consumers a richer experience, encouraging them to stay longer in a retailer's physical store, become more engaged with the brand and ultimately spend more money.

The main goal of this research is to review the latest trends in mobile commerce applications and to develop an Android-based mobile application "E-Grocery" to help residents in Bahrain do shopping for groceries in just few minutes. With E-Grocery app, residents visually create their lists by picking from various different items from different categories, and then these items will be delivered to their doors directly. The app is so much more than a grocery list app; it is an incredibly friendly, highly customizable and full-featured grocery. E-Grocery is useful and helpful for all residents of Bahrain. E-grocery is a mobile-based grocery store that allows users to purchase supermarket products over the Internet to be delivered to the person at a later time. Ordering the desired items can be selected items through listings of products or sections. The products offered by mobile grocery app are identical to a normal grocery store. When customer has been finished shopping, checkout is made, and then the customer must identify certain hours that s/he will be available to receive the food for delivery.

If people are pressed for time, visiting a grocery store is not an ideal routine. Going with a grocery delivery service means they never have to set foot in a store, leaving them more time to work, enjoy their family, and even take a few minutes for their selves. Grocery delivery service sound like a perfect solution and time-saver: people would simply log on to the application, select the items they wish to purchase, enter payment and shipping information and wait for their groceries to appear at their door. They can also save their "grocery wish list" in the app without the need to write them done on a piece of paper. What the surveys resulted and how customers reacted positively on our idea encouraged us to start building E-Grocery application.

Nowadays, the mobile phone is in everywhere and it is the most common mode used in order to access to the Internet. On the other hand, shopping for grocery is became very important too. Thus, we developed this mobile application, which can be considered as first of its kind in kingdom of Bahrain. Through this app, user can easily purchase products in anywhere at any time. The aim of this research is to take advantage of the technology by designing an Android application to make the grocery shopping more convenient and much easier and time saver than before. Our main objectives are summarized into: Taking advantage of the Android eclipse itself and the way that Android introduces the smartness of designing and displaying information; Grocery shopping can be done from remote locations (in anywhere, on anytime); People can do their shopping in the middle of doing other tasks; Helping injured and handicap people; Less time and effort for grocery shopping; Make the grocery shopping more convenient and entertainment; Designing professional and useful interface for the users.

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Background

2.1 M-Commerce in Bahrain

On 2014, yStats.com, Germany-based Company, established a report on business to consumer commerce, reveals that people in Bahrain become more familiar with online shopping and the growth rate is rapidly increased very year. Also, the report mentioned that more that 5% of retail sales are occurred online. In addition, as penetration of smart phone and tablet becomes high and the access to the Internet through mobile phone is the most common mode used recently, so "Mobile commerce has high potential in the Middle East," Nirvana Consultancy's chief analyst said (Saxena, 2014).

The number of mobile subscribers has increased steadily since 2005. At the end of Q2 2008, there were over 1.24 million mobile subscribers in the Kingdom of Bahrain (Yas Alsultanny, 2012). The competition between service providers plays a major role in enhancing the current services and it is a main source of the entrance of other new services to the telecommunication markets. The Batelco and Zain are telecommunication companies working in Bahrain, providing 3G services and teleconferencing as part of the competition between these companies. These services changed the M-commerce services in Bahrain to a large degree. In many developing countries, mobile phone users use handsets for many services such as purchasing from retail stores, conducting personal banking, making travel reservations, viewing sports and news programs, and searching the web. In Bahrain, mobile operators offered many mobile services and some of these services are offered for the fi rst time in the Middle East, such as 3G service and teleconferencing. This means that the development of mobile services in Bahrain is at a development stage. The main current mobile services provided by mobile operators in Bahrain are as follows: Multiparty conference, Video call, Chat services, News services, SMS to TV / Radio channels, Auto fax and Data, Mobile office, Mobile Banking, Weather News, Internet, Roaming, Credit Transfer, Missed call Alert, Say it, Tarjim, Other services include SMS, MMS, Voice, Messaging service, family and friends, services and O-mobile (Yas Alsultanny, 2012).

The M-commerce implemented in different sectors in Bahrain include the following: 1. E-government : E-government is an electronic system that enables citizens and businesses to gain access to government information and services using the Internet, telephone and other technology as they emerge on a 24-hour basis. It also presents the country that uses it with opportunities to move forward with higher quality, cost-effective government services and a better relationship between citizens and their government. The government of Bahrain started E-government, and the mobile or M-government will be part of this project as stated in the E-government strategy. E-government authority declared that ' it has been taken in mind the ease and simplify the procedures for use of the services available through this gate, which will be accessed through the Internet, but will be extended to include multiple entry channels, such as telephones and other portable in the later stages '. This means than M-government will be part of the E-government plan, which has already been implemented. 2. Finance sector: The finance sector has benefit ted, as other sectors have, from the expansion and development of mobile services. Most of the banks have established mobile banking service, which allows their customers to use this service to check the account transaction and other process and services. 3. Health sector: Some of the private hospitals and clinics provide new services by mobile phone. When patients take appointments from these hospitals, they will automatically receive an SMS to notify and confirm the appointment. In addition, the service will notify the patient



again 1 day before the appointment to remind the patient about it. 4. Car agencies: Car agencies like Kanoo for Toyota cars try to get the benefit from M-commerce services and use mobile to generate for their customer some confidence services. 5. Bulk SMS: Other public and private organizations have started to send bulk SMS to citizens, informing them about certain activities and events (Yas Alsultanny, 2012).

2.2 E-Grocery

On March 2012, Mirko Warschun established a research paper which concludes that online grocery is growing quickly in some countries. However, there are some other countries that have been recorded as slow growing in this field. The United Kingdom has a particularly vibrant market, with Internet grocery sales comprising 4.5 percent of (Warschun, 2013) total grocery sales in 2010. In other countries with similar characteristics, however, growth has been slow; the Internet comprises just 0.2 percent of total grocery sales in Germany (Warschun, 2012). Moreover, on 2012, another research paper written by Rainu Tanveer Singh, focuses on online grocery stores in India and reveals that online grocery shopping stores are beneficial for the consumer. Singh mentioned the most successful online grocery stores that really benefit the people in his country and makes online grocery shopping so convenient. Some of these online stores are Aaramshop.com is a website for buying groceries based in New Delhi, and Fresh N Daily which is online store for fruits and vegetables based in Mumbai. "India is among the fastest-growing markets and has been identified as one of the significant potential markets for the company (Singh, 2012). ASDA is a supermarket that has many stores around the world, especially UK and US. In 2010, ASDA started to launch online business asda.com to offer online shopping services. Asda.com contains different categories; the customer can choose the desired items and quantities, then the system add selected items in cart page. Finally, the customer can checkout and choose whether to pick up in store or to have straight delivered to his/her door (Asda, 2011).

2.3 Similar Mobile Applications

In this section, we review existing similar mobile applications in other countries and review their features. Some of these applications are presented below:

1. Mega Supermarket: is a mobile application based in Israel for supermarket delivery services. This app offers: Personal Page: Employees can log in and see all the deliveries they are assigned to. From this screen, they can open any delivery order and view the additional information regarding the time-frame, address, etc. Comparing this page with our E-grocery-Client page, E-grocery had a similar page to allow admin view the customer's order. Moreover, tt offers a Functional Page: The main screen can deal with changing the quantity of the specific items, exchanging the item for similar one, and checking the items that already are in the cart. Comparing this page with our app, the admin can view, add, edit, or delete any product under the product section.

2. TOPS Supermarket: is a mobile application based in Thailand. This app helps customer saving his/her valuable time with useful features available from his/her smartphone. Features are: My Tops: here customer can check the spot or e-coupon; My Shopping list: customer can create his/her own list; what's new: Customer can know the new promotions or items available in supermarket; Discover more: Recipes and tips; and Your Comment: the Customer can give feedback. Comparing this app with E-grocery, E-grocery gives a feature to the customer to have a special discount by entering the promotion code. Also, the E-grocery's customers have opportunity to create their shopping list in Cart page. Moreover, e-grocery has slides show to keep customers

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updated on what is new in E-grocery. Finally, the customer can keep touch with us by contact us in Contact us page.

3. Amazon App: is commercial mobile application based in US that sells numerous types of products. Amazon has many retails around the world such as UK, Ireland, France, and etc. Also it offers international shipping to certain countries. We have taken interface design of Amazon app into our considerations to build E-grocery: Home page: Contains promotions and most recent products add to the system; Menu: easy to move from one page to another; and Product page: we have used similar procedure that Amazon used to view its products.

Methodology

This study follows the Agile approach in the development of "E-Grocery" Android-based mobile application Agile software development is a rapid and iterative method. The software comes in increments based on the requirements and feedback from stakeholders. Moreover, the aim of the agile method is to respond quickly to changing requirements. In this approach, stakeholders are totally involved and frequent feedback is vital for Agile development. The application developed by the Agile team will be subject to stakeholder review and feedback. Validation is integrated throughout the life-cycle. This study will follow Extreme programming method. It is one of the most common agile methods. It is a widely used method because it is focus on code rather than design.

Many techniques are available for gathering requirements. In this study, we utilized multiple techniques to collect and identify the desired features of the app from different stakeholders. Interviews: One of the primary ways analysts gather information about an information systems project. Prototyping: Prototyping is a relatively modern technique for gathering requirements. Using this technique, we gathered preliminary requirements that we used to build an initial version of the solution — a prototype. Questionnaires: Questionnaires are much more informal, and they are good tools to gather requirements from stakeholders in remote locations or those who will have only minor input into the overall requirements. 100 usable responses from different stakeholders will be sufficient for this research. Joint Application Design (JAD). Using this technique, we brought together key stakeholders. In JAD sessions, the participants stay in session until a complete set of requirements is documented and agreed to.

Analysis and Design

We have utilized two techniques to collect out requirements; interviewing and questionnaires. The purpose of interviewing is to get an in-depth understanding of the organization's objectives, users' requirements and roles. The personal contact allows the interviewer to respond adaptively to what is said; it is possible to probe in greater depth and if the interviewee has little or nothing to say, the interview can be terminated (Laudon, 2014). The interviews were conducted with the Customer service assistant (CSA) in Géant supermarket - large size shopping supermarket in Bahrain- , and with the Sales supervisor in the same store.

4.1 Functional requirements

Functional requirements identify the services that the system should provide, and identify the behavior of system in particular actions. The functional requirements of E-Grocery application include: The system will consist of two actors, Admin and Customer. The



functional requirements for the Admin include: The system should allow admin to login; The system should allow admin to change and improve any components in the system including adding new items in any sections, updating, or deleting; The system should allow admin to view, edit, or delete any customer from the clients' list; The system should allow admin to view, edit, or delete promotion coupon; The system should allow admin to view the recent customer's orders with detailed information (under the order section).

The functional requirements for the Customer include: Customer should directly access to the application; Customer should login or register for new account; Customer can view and choose from the displayed products from any sections; Customer can make the purchase by adding products into the cart; Customer can view all selected items in the cart page and modify them; Customer can check out by ensuring that all the information provided is correct, and then specifying the date and time that would to have the order delivered; Customer can insert coupon code before finishing from checkout process to have a special discount on total purchase; Customer should view the history of pervious orders; The system should send notification message to the admin by email; The customer should receive a notification message from the system.

4.2 Application's Structure

The application's structure consists of two main parts: Admin interface (Content Management System) which is a web page that will be used by the Admin only. Admin has the authentication to login and access to add, edit, update, and delete contents of the E-Grocery app. Client interface: which is an android mobile-based application that will be used by customer.

4.3 Application's Major Modules

The application's Major modules include: Splash screen; Home page; Sign up; Login; Promotion; Categories; Cart; History; Contact us; About us. Major modules within the admin webpage include: Login/out; Add categories; Add products; Edit and update categories; Edit and update products; Delete categories; Delete products; Add or delete promo coupon; View, edit, or delete customers; View the Customer purchase; Save data.

4.4 Application's Major Sub-Modules

The application's major sub-modules include: Splash screen: such a page to welcome the customer while E-grocery is launching; Home page: this is the main page that includes the recent activities or announcements that the supermarket would like to inform their customers about; Signup page: here the customer should give the system his/her detail to create new account; Login page: here the customer should insert the username and password in order to start shopping; Promotion: includes the products that are under the promotions; Categories: includes all categories that the supermarket has; Cart: includes all the products that customer would like to purchase; Checkout: include forms that customer should fill with his/her personal and address information; Delivery page: include forms that customer should specify the date and time that s/he would prefer to have the products delivered; Coupon page: here the customer can insert a code (which the promotion coupon) to have a special discount on total amount; History page: this page can the customer views all the purchases that has been done in E-grocery; Contact us: if customers have any suggestions or problems, they can easily contact us by providing their information such as (name, email address, and message) by filling the forms provided. Also, this page provides supermarket's contact details (location of store (if exists), email address, phone); about us: a page that lets customers to know more about E-grocery.





Sub major modules within the admin webpage include: Login/out: the admin can sign in and out by using the username and password; Add new categories to the list; Add new products to the list; Edit and update information about categories such as name, and image; Edit and update information about products such as name, price, description, image, category that its belong to, and promotion price (if applicable); Delete any category from the category list; Delete any products in any category; Promotion coupon page: the admin can add new discount coupon. Also, admin can view or edit any of the existed coupons; Customers' page: Admin can add new customers, view, edit, or delete existed customers; Customer's purchases page: admin in this page can view all customers' orders; Save the latest updates.

4.5 Detailed System Design

This section presents the detailed design of the application logo and some selected pages. The Application's logo is shown in Figure 1. E-Grocery is the name of the application that means online shopping for groceries and we have designed the logo and system's color based on customers' choices. Blue color was most color chosen in survey because it's so attractive and elegant.



Fig. 1: Application's logo

The Application's home page is shown in Figure 2, the home page of e-Grocery will appear, after splash screen disappeared. This page consists of two main parts: Slide shows: that contains the announcements and the new activities that the supermarkets would like to inform their customers. It can contain a group of images, texts, and buttons. Menu in Action bar: contains six sections, which are promotion, categories, about us, contact us, login, and signup. By clicking onto any of these sections, it will shift you to its specified page. When customer logged in, the menu will change and add two more section, which are history and cart. When the customer open the application, a splash screen will automatically appear for seconds until the content of the application be loaded. This splash screen contains the E-Grocery logo and loading icon, which indicates that system in a process to open the application.



Egrocery*	Egrocery*	Egrocery*
	Promotion	Home
	Categories	Promotion
	About Us	Categories
Event O	Contact Us	About Us
Categories Welcome to Egrocery	Login	Contact Us
Grocerying on a Click!	Signup	Histroy
Front Car		
		Logout
		() Personal Care

Fig. 2: Application's home page

Implementation and Testing

5.1 Software Development Platform

To develop our system we have used mainly two types of software. First, for the application - client side: Eclipse software standard 4.3.1. Second, for the admin website - webserver; Adobe Brackets 1.3.0, which is a modern, open source code editor for web which includes JavaScript, html, and CSS (Stewart, 2015). Moreover, we have used Bootstrap 3.34 to choose a proper design structure for our system. Bootstrap is an open source offered by Twitter.inc to give the public the opportunity to create framework for developing mobile projects and websites. (Otto, 2015) Plus, we have used PhoneGap developer app / Gordova to develop design structure of mobile application and to migrate system (webserver) to eclipse workspace. Besides all that, we have viewed our app on a virtual device by using the phonegap / Gordova. (Brooks, 2014)

5.2 Validation

E-Grocery has gone through the validation process in order to determine the level of success. First, to ensure connectivity and functionalities, the IT Manager in ICT Department at the Royal University for Women checked the system; his feedback was" User-friendly and well-structured interface. Easy to navigate and interact with the application. Also, the Customer Service Assistant (CSA) in Géant Supermarket, the one we took the requirement from tested the app, "everything is excellent and meet our requirements except the cart page need some improvements; for example the price of each product should be shown not only the total". Moreover, validation with selected customers was arranged to validate the application. At the end, we improve the application based on their comments and feedback. Consequently, we believe that our application meets all the expectations and it will have a chance to achieve high and special records in the market.



Conclusions and Recommendations

This paper is sought to review the latest trends in mobile commerce applications and to develop an Android-based mobile application "E-Grocery" to help residents in Bahrain do shopping for groceries in just few minutes. With E-Grocery app, residents visually create their lists by picking from various different items from different categories, and then these items will be delivered to their doors directly. The app is so much more than a grocery list app; it is an incredibly friendly, highly customizable and full-featured grocery. E-Grocery is useful and helpful for all residents of Bahrain. This application will help people to save their time, manage their duties, and avoid the suffering of coming physically to the store searching for groceries. Especially, for handicaps who cannot come to supermarket regularly.

In the paper the role of mobile telephony during the requirements collection process has been highlighted and presented in the survey (see appendix). The results of the study show that there are differences in customers' preferences in terms of using mobile phone in-store. Female respondents are more traditional than men. Surveyed men more often than women utilized mobile phone for searching the Internet in order to compare the price of the product, read the reviews, information on competitive websites, while a majority of women called a friend in order to obtain some advice. Surprisingly, there is no correlation between the age of respondents and the extent of using mobile phones in the shop.

The research results show that cell telephony while shopping has yet to reach the same level of popularity among Bahraini customers, which it has attained in other countries. From an academic point of view, the results open up for further research on mobile Apps development. All of the mobile manufactured companies and mobile application developer companies are increasing the capacity, quality and functionality. So the modern mobile applications are more capable and more usable for the user.

The decision makers and M-commerce providers should take the following key success factors: Variety of services and their quality, Service prices, Handset prices, Customer support, Security of services, Marketing and promotion, and Customer Awareness. The security of services could have a major impact on customers' behaviors and trust when using M-commerce services.

The most important recommendation that improves utilization of M-commerce is: 1. Mcommerce should be implemented in different areas. 2. Mobile operators have to increase customer awareness about services of M-commerce by using SMS services. 3. Increasing the marketing channels for M-commerce services, especially the new ones, by using the most popular advertisement channels, such as the local TV, which are viewed by most of the citizens.

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THE ESTIMATED OPERATING COSTS OF AGRICULTURAL MACHINES IN HUNGARY IN 2017

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Abstract

One of the most important tasks of National Agricultural Research and Innovation Centre Institute of Agricultural Engineering is to provide information each year on the operating costs of agricultural machines in Hungary. The operating cost of agricultural machinery change every year. The control of operating costs is very important for all involved (producers, researchers, managers, etc.) in agriculture because they constitute a significant proportion of agricultural production costs so they have fundamental influence on the efficiency of production. My main aim is to present the operating costs in Hungary in 2017 and make a proposal for cost reduction.

Keywords: direct and indirect cost, farm, performance, production

Conference Topics: Economic strategy, Macroeconomics

Introduction

It is difficult to produce in the agricultural within field conditions without machines. The most important factor of the competitive production is the mechanization, which enables the realization of the work in a timely and high quality manner by the use of modern agrotechnics. Nowadays in Hungary, about one thousand distributors deal with the trading of agricultural machines and spare parts thus the portfolio of machines is very diverse and broad.

The main statistical data (e.g. total number, average age, etc.) of agricultural machines can be found in the yearbook of Hungarian Central Statistical Office and reports of Research Institute of Agricultural Economics. However the prices and costs of agricultural machinery, including operating costs, are also changing in each year. The National Agricultural Research and Innovation Centre Hungarian Institute of Agricultural Engineering annually monitors the operating costs based on Hungarian farm data and publishes a booklet.

Material and Methodology

Power machines include tractors, combine harvesters, self-propelled loaders, self-propelled harvesters and other self-propelled machines.

In agricultural practice the performance of power engines summarized with different equivalences (e.g. working hours, normal-hectare, kilowatt-hours). One normal hectare (1 nha) means the performance of medium deep ploughing (16-21 cm) on 1 hectare flat field [Hajós et al., 2005]. 1 nha = 26,315 kWh.

In my calculations the following costs factors were used.

- Direct costs:
 - fuel and lubrication costs,
 - wages and the costs charged to this: basic and supplementary salaries of power engine driver, social contribution tax and cost of sick leave,

- maintenance and repair costs: in the latter part of the repair materials and repair payroll and overhead costs, as well as improvements to the cost of other businesses,
- amortization,
- other expenses: vehicle tax, insurance + accidents tax, equipment storage, clay and plant parts procurement, storage and dispensing in the workplace, as well as wagerelated costs are of a general nature.
- Indirect costs:
 - the fixed and current assets, capital gains, interest on debt, other terms of income needs,
 - general costs associated with the machines.

The total operating cost is the sum of the above seven costs. It is important to note that the prices and costs do not include VAT.

The changes are determined by the actual and planned numbers of base farms, by experiences of machinery and parts distributors, by the data of Hungarian Central Statistical Office and of Research Institute of Agricultural Economics, as well as by specifications of the different regulations in force.

It is emphasized that wide variety of power machines and equipment are operating under different conditions by the farmers, so their costs can be very different.

Research results

Costs of machine works

Why is it important to control costs? It is essential to make a right decision for all producers, managers, etc. in the agriculture. The operating costs constitute a significant proportion of agricultural production costs, so these prices have a fundamental impact on the efficiency of production. In the case of the high operating costs it is necessary to replace the machines in time. It could be a positive impact on profit when the farmers choose the most suitable machine. If the farmers do not reduce their operating expenses, they will not be able to compete in the agricultural sector effectively.

The operating cost of machines depends on several factors.

The estimated change of the different factors (compared to the previous year):

- basic wage rate: +3%;
- additional wage: 10% of basic salary;
- social contribution tax: 22% of basic wage;
- sick leave: +2%;
- maintenance and repair cost: + 6%;
- price of machines: + 7%;
- amortization: +10%;
- insurance: +15%;
- storage of equipment: + 3%;
- purchase and storage of materials: + 4%;
- fixed and current assets, capital gains: +4%;
- general economic cost: + 5%.

My work contains only diesel operated power machines. The price of diesel oil is ca. 325 HUF/kg (tank car) and the lubricants to be considered as major presentation on the average price of 850 HUF/kg. (1 EURO is 310 HUF.)

Table 1 and 2 show the performance and operating costs of some powers machines in 2017.

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Table I The	performance	e of some	powers machines	(excluding VAL)
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Performance Performance								
[kW]	Average of engine performance [kW]	[working hours/year]	utilization of capacity [%]	[nha/wh]	[nha/year]			
		Tractors						
21-40	30	1500	24	0.274	410			
41-75	58	1600	27	0.595	952			
76-100	88	1700	31	1.037	1762			
101-150	125	1800	35	1.663	2993			
151-200	175	1900	38	2.527	4801			
		Combine harve	sters					
76-100	88	550	30	1.003	552			
101-150	125	575	31	1.473	847			
151-200	175	600	32	2.128	1277			
		Self-propelled lo	baders					
21-40	30	1600	25	0.285	456			
41-75	58	1700	26	0.573	974			
76-100	88	1800	27	0.903	1625			
101-150	125	1900	28	1.330	2527			
151-200	175	2000	29	1.929	3857			
		Self-propelled harveste	ers (mowers)					
41-75	58	500	28	0.617	309			
201-250	225	600	30	2.565	1539			
	Other self-propelled machines							
21-40	30	400	24	0.274	109			
41-75	58	450	25	0.551	248			
76-100	88	500	26	0.869	435			
101-150	125	525	27	1.283	673			
151-200	175	550	28	1.862	1024			

Source: [Erdeiné Késmárki-Gally et al., 2017]

Table 2 T	The operating	costs of some	powers machines	(excluding VAT)
14010 2. 1	The operating		powers machines	

	Average of		Costs [HUF/nha]						
Performance [kW]	engine perform. [kW]	fuel and lubricats	wage	mainte- nance and repair	amorti- zation	other cost	fixed and current assets, capital gains	overhead cost	Total operating cost
				Tra	ictors				
21-40	30	3420	4877	2391	1148	534	304	618	13292
41-75	58	3197	2376	1885	761	363	204	429	9215
76-100	88	3008	1445	1513	800	264	201	352	7584
101-150	125	2853	956	1279	786	223	193	305	6595
151-200	175	2736	666	1106	685	196	168	269	5827
				Combine	harvester	S			
76-100	88	3102	1678	3810	3394	586	740	628	13938
101-150	125	2944	1212	3357	3142	474	681	556	12366
151-200	175	2839	889	2916	2917	388	630	497	11077
				Self-prope	elled loade	ers			
21-40	30	3537	5257	4333	2484	627	588	812	17638
41-75	58	3309	2772	3989	2152	467	501	635	13826
76-100	88	3146	1865	3852	1871	400	436	557	12125
101-150	125	3051	1342	3783	1630	366	383	509	11064
151-200	175	2955	981	3714	1423	333	338	470	10214
			Sel	f-propelled ha	arvesters (mowers)			
41-75	58	3051	2575	4691	4399	648	953	768	17638
201-250	225	2680	783	2784	3422	314	728	499	13826
Other self-propelled machines									
21-40	30	3249	5476	5190	6416	1053	1383	1069	23836
41-75	58	3087	2883	4691	5475	670	1170	840	18817
76-100	88	2944	1936	4192	4738	516	1011	716	16053
101-150	125	2818	1392	3692	4345	424	924	634	14228
151-200	175	2741	1016	3208	3999	363	849	566	12743

Source: [Erdeiné Késmárki-Gally et al., 2017]

The calculated operating cost of a few agricultural works are according to Table 3.

Tuote 5: The operating	<u>5 60565 01 a</u>	ien majer ag	induitarai wornd (endraan	<u>ng (111) m</u>	2017
		Total operating			Total
		cost			operating cost
Agricultural machine work	Performance	(HUF/ha)	Agricultural machine work	Performance	(HUF/ha)
Ploughing up to 20 cm	21-40 kW	14414	Slurry injection	21-40 kW	64389
Ploughing up to 20 cm	41-75 kW	10337	Slurry injection	41-75 kW	48081
Ploughing between 21-26 cm	21-40 kW	20901	Mowing	21-40 kW	9248
Ploughing between 21-26 cm	41-75 kW	14989	Mowing	41-75 kW	7209
Ploughing between 27-32 cm	21-40 kW	25225	Baling with small baler (2 t/ha)	21-40 kW	7892
Ploughing between 27-32 cm	41-75 kW	18090	Baling with small baler (2 t/ha)	41-75 kW	6262
Smoothing	21-40 kW	5042	Baling with small baler (4 t/ha)	21-40 kW	15785
Smoothing	41-75 kW	3615	Baling with small baler (4 t/ha)	41-75 kW	12523
Harrowing	21-40 kW	4962	Baling with big baler (2 t/ha)	41-75 kW	9392
Harrowing	41-75 kW	3535	Baling with big baler (4 t/ha)	41-75 kW	18785
Rolling	21-40 kW	5035	Bale packaging (2 t/ha)	21-40 kW	3925
Rolling	41-75 kW	3608	Bale packaging (2 t/ha)	41-75 kW	3110
Row cultivation	21-40 kW	6610	Bale packaging (4 t/ha)	21-40 kW	7851
Row cultivation	41-75 kW	4980	Bale packaging (4 t/ha)	41-75 kW	6220
Soil loosening	41-75 kW	27281	Harvesting (cereals) (4 t/ha)	76-100 kW	22301
Sowing (cereals)	21-40 kW	7508	Harvesting (cereals) (4 t/ha)	101-150 kW	19786
Sowing (cereals)	41-75 kW	6163	Harvesting (cereals) (7 t/ha)	76-100 kW	39028
Sowing (corn)	21-40 kW	8823	Harvesting (cereals) (7 t/ha)	101-150 kW	34626
Sowing (corn)	41-75 kW	7274	Harvesting (corn) (5 t/ha)	76-100 kW	27877
Sowing (sugar beet)	21-40 kW	11287	Harvesting (corn) (5 t/ha)	101-150 kW	24733
Sowing (sugar beet)	41-75 kW	9697	Harvesting (corn) (8 t/ha)	76-100 kW	44603
Sowing (vegetable)	21-40 kW	13336	Harvesting (corn) (8 t/ha)	101-150 kW	39572
Sowing (vegetable)	41-75 kW	11501	Harvesting (sunflower)	76-100 kW	18120
Spraying	21-40 kW	5427	Harvesting (sunflower)	101-150 kW	16076
Spraying	41-75 kW	4204	Harvesting (oilseed rape)	76-100 kW	21744
Fertilizing	21-40 kW	3927	Harvesting (oilseed rape)	101-150 kW	19292
Fertilizing	41-75 kW	2907	Harvesting (sugar beet)	101-150 kW	54067
Organic fertilizing	21-40 kW	23519	Harvesting (potato)	41-75 kW	60375
Organic fertilizing	41-75 kW	19442			

Source: [Erdeiné Késmárki-Gally et al., 2017]

Cost reduction possibilities

The operating costs of agricultural machines are constantly changing. The effective cost management is very important for the farms.

Improving of utilization of machines and increasing its annual performance are the most important options. The specific value of the machine operating costs can be reduced by improving of annual working hours of machines with better organization or with lease work.

Another important thing is the fuel consumption, where the amount of the propellant per performance unit is usually 5-20% higher than the optimal (30.4 kg/100 kWh). This ratio can be reduced by higher technical standard, optimal power machine-equipment combination, by the proper maintenance of the engine, as well by the choosing of the right power machine type and engine performance. According to our data the operating costs of more powerful engines (in normal using) are more favourable.

The below tables and Figure 1 show clearly that the performance of the power machines [ha/hour] compared to 100 ha field size are considerably lower by 50 ha fields, and largely lower by 18 ha fields. However, the cultivation cost [HUF/ha] increases by smaller field size. The operating costs of more powerful power machines are better. However, the larger machines cannot be used by small farms and by small fields, and therefore increase the size of the fields would be justified.







Figure 1. Costs of medium deep ploughing and its proportion depending on size of the field Source: [Erdeiné Késmárki-Gally Sz. et al., 2017]

Significant cost savings can be achieved with a right insurance agreement.

Another option is to use cost-effective machine cooperation forms (e.g. multi farm use of agricultural machines, etc.).

Of course the cost of production is affected not just by the above mentioned factors, but by other factors also (e.g. soil conditions). The average productivity of the Hungarian agriculture has improved in recent years; due not only for the technical equipment supply growth, but the device efficiency (capital productivity) improvement. However, the arable crop producing farms were characterized by extensive growth; the increasing of the technical equipment supply was not accompanied with improvements in the productivity of capital. The investment subsidies may have played an important role in this process [Takácsné – Takács, 2016].

Conclusion

The total machine operating costs (compared to the previous year's) increased with an average 3.7% at tractors and 5.2% at equipments in 2017. The production cost were a significant proportion of the machine's operating therefore it is important to pay attention to the possibilities with which using machine is more efficient and less expensive. To improve the current situation, all managers should be aware of the prices, production costs, profitability, as well as the factors influencing them.

Using machines influenced by a lot of factors in the practice. In order to improve the effectiveness the producers need to increase the efficiency, the quality and discipline of work, and to reduce costs. The prerequisite for good management and development decisions is to know the achievement, cost data, fuel consumption of machines.

Based on the various domestic studies it can be stated that some factors of machine operating cost is gradually changing in practice therefore to ensure a profitable management it have to economize costs.

It may be the most important to improve the utilization of machines and to increase the annual performance, the annual number of working hours, working hours per kWh or nha, and outputs, so the specific machine operating costs may decrease. It is important to choose the good firm and board size, the most suitable tractors, the most appropriate power engines.



The maintenance and repair works have to carried out carefully, the uneconomical machine must be changed timely, etc.

Description of detailed cost figures and costing methods can be found in the booklet of the Institute. The title is: Cost of agricultural machinery in 2017 (in Hungarian language).

Brief biography of author

She is a college professor at the Budapest Metropolitan University and a researcher at the National Agricultural Research and Innovation Centre (NARIC) Institute of Agricultural Engineering. She has a PhD and "dr.habil" degree in Management and Business Administration. At present she focuses on the examination of the innovation driven "market-oriented development system" and the analysis of operating costs of agricultural machines in her research works. She teaches Bachelor's, Master's and postgraduate students in the fields of economics and gender studies (Business Economics, Corporate Economics, Management, Strategic Planning, and International Economics, etc.).

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Multidisciplinary Academic Conference

Fractal Geometry and Economical Analysis

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Abstract

The article is dedicated to the theory of H.R.Elliot and N.F.Helge von Koch. The first part further specifies the designation of fractal and fractal geometry, and then focuses on joining fractal geometry and financial market behavior using the Koch curve. The last chapter describes financial time series using the theory of Elliott waves, which are specified by H.R. Elliot's behavior on individual financial exchanges.

Keywords: fractals, fractal geometry, financial time series **Main Conference Topic:** Economy, Management and Marketing

Introduction

Theories of fractal geometry have been addressed by the world for decades, but only currently are entering the subconscious of individuals in different fields. Many real systems are nowadays modeled thanks to the theory of chaos and fractal geometry. Many of us imagine a nonlinear character of a system while mentioning the above terms. Chaos is labeled as irregular, repeating, but mostly unpredictable behavior of a specific system. Today the theory of chaos is an integral part not only of mathematics, but also other sciences like for example physics. In the past the world was described only with the help of the "Newton determinism", an example being the weather – it could only be predicted with high-performance computers by modeling specific systems but today we can see that this is not the case. Weather itself cannot always be predicted with 100% accuracy, because we are talking about influence and motion of multiple factors which decide on the weather output, it is possible to determine weather with a certain precision at maximum 5 days in advance. Therefore it may be stated, that a more suitable term of weather forecast would be a "precondition or projection". In economics the theory has been used when applying financial time rows/strings. This article examines the theory created by H.R. Elliot.

Brief history of fractals

Fractal geometry, just as the theory of chaos, is a relatively new science discipline, but when studied in detail we find out, that this problem has been already examined by scientists in the past. In the 19th century Karl Weisstrass came across the so called continuous function, which does not contain in any of its points any derivation. This discovery is made by the German mathematician Georg Cantor in 1884 with the non-zero dimension less than 1 called the Cantor set. Today this most simple fractal is also one of the most popular ones. In the year 1904 the mathematician Helgen von Koch described a curve, which started to concern many mathematicians at the time, since this curve differentiated from classic geometrical patterns. The given mathematical object is known as the Koch Curve and concerning nowadays


scientific disciplines, their history goes all the way back to the sixties of the 20th century. The first scientist to have successfully studied the theory of chaos and the problems related to it. was Edward Lorenz. This problem was called the "Butterfly effect". The result of its study lead to a discover of the most well known attractor, called Lorenz strange attractor, which was the cornerstone of the theory of chaos and its understanding. Many other scientists took part in the examination of this problem, both well known and unknown, for example Stephen Smahel with his topological transformation - the Smahel horseshoe, James Yorke, Robert May, Benoit Mandelbrot, (who used the term ,, fractal" for the first time in 1975 and is also considered as the founder of fractal geometry) and many more.



Figure 1: Lorenz strange atractor: "butterfly effect"

Fractals and fractal geometry

The term "fractal" was used firstly by the mathematician B. Mandelbrot in the year 1975. B. Mandelbrot described and named the objects and united the theory of fractal geometry together with other scientists and mathematicians. The word "fractal" derives from the Italian "fraktus" which means shattered or broken. A fractal is a term for objects, which are characterized mostly by containing endless lesser copies of themselves, and every copy is different from the remaining - this is a geometrical element which has the following attributes:

- Similitude while examining any object, our perspective is repeating a characteristic shape in different measures or resolutions
- The initial perspective on the examined object is very complex, while its repetitions however may be generated by specific regulations

Fractal geometry is a tool which serves to describe different structured objects. The given objects are different in a specific reduction or enlargement. An example of this may be a never changing coast line. If we look at two maps of different scales we will come to a conclusion that the coast line looks the same on both maps. Nonetheless, B. Mandelbrot describes this reality a little otherwise when measuring the British coastline - first he used satellite maps, then tourist maps. Result: the length of the coastline on the tourist map was 2x up to 3x longer than the satellite map coastline. Thus, the tourist maps are more detailed, which means that when measuring the length of a coastline with satellite maps, some details are left out or overlooked. Mandelbrot, thanks to his research, found a connection with the Hausdorff dimension and thus a coastline may be considered as a fractal. Describing the level



of complexity of an object is calculated or estimated by the so called fractal dimension. The fractal dimension allows to explain complexity of an object based on the speed of growth of length, content or volume in dependence of the scale size which we use to measure. There are two elemental types of fractal dimensions:

- Similitude dimension, which may be applied to structures, that are purely similar to each other – a line and it's segments, a square within a square or for example a cube within a cube. This means it is possible to dismantle a given object or shape into multiple segments in such a way, that every segment is a reduced copy of the whole.

The relation of dimension *D* is: $D = \frac{\ln a}{\ln s}$ (s... is factor of reduction, *a* ... is number of

segments)

- Grid dimension – this dimension may be used for any shape. This means that we would draw a square grid with an *s* x *s* amount of squares and out of this we calculate, on how many squares the given shape is located. The result dimension is then a grow dependence derivation ln (N(s)) in dependence on ln(s)

For further understanding of the fractal dimension and its definition, we may use a division into topological dimension D_t and covering dimension D_p .

Topological dimension D_t – this dimension is used mostly in a science called topology. It does not study the size of geometrical structures, but studies their properties, which are invariant to the deformation or rotation. Whether the structure is round or angular, large or small, is not an object of investigation, rather these properties are changed thanks to certain deformation. The Topological dimension shows interest in the connection of the structure and whether the structure contains any openings and often work in areas with many dimensions.

Covering dimension D_p – this dimension is a set of points, curves or surfaces which cover each other at a certain place with discs by multiple possible methods. The examined structure may be covered by one disc or a pair of discs, which have a zero intersection – named also as doublets, furthermore by three discs also named as triplets, but may also have a joint intersection by multiple discs – quadruplets. In the below figure showing covering dimension it is possible to observe a cover of curve in a surface, where the curve is covered in four different ways. We may also see a set of isolated points, which cover a sphere of infinitely small radius or a depiction of covering dimension in an example of a cube.

Application of fractals in economic analysis - financial time series

While studying where and how fractals are created, we may only determine exactly with mathematical fractals, because they come to existence with exactly defined geometrical transformation.

Division of mathematical fractals by the algorithm of construction:

- IFS (Iteration Function System) – transformations that are repeated in cycles

- TEA (Time Escape Algorithms) – the algorithm is used for user determined boarders and for construction with the help of the complex plane



Further division of the fractal is possible within the deterministic, stochastic or another alternative may be dividing fractals into similitude or self-related.

Natural fractals in comparison to mathematical ones is never strictly in similitude, because while enlarging of a natural structure, the structures are never exactly the same. Mathematical fractals do not have a significant importance compared to natural fractals, speaking of practical life.

Interesting examples of natural fractals may be a snow flake and its complex structure – while describing a snow flake, the results are limited only to one exhibit, since the snow flake would never fall identically the same and always each snow flake would slightly differentiate from the other. Further fractals are for example mountains, lightning, river flows, trees or leaves. Properties of a fractal may be described at best with the Koch Curve, which is valid for most examined fractals.



Figure 2: Koch curve

Koch curve

The Koch curve and its indication is linked to the mathematician N.F.Helge von Koch, who was born on the 25.1.1870 in Stockholm. In 1892 he received a doctorate in mathematics at the Stockholm University. He developed two works, which were related to solving systems of differential equations and he obtained the position of mathematical professor in 1911. Today he is known for his naming of the fractal curve, which he explained in the work called "Une méthode géométrique élémentaire pour l'étude de cartaines questions de la théorie des courbes plane", presented in 1906. The result of this work is the claim, that the curve is connected/continuous, but it does not have at any point a determined tangent.

The Koch Curve is one of the first determined fractal curves. It is a connected/continuous curve which is not intersected at any point, and does not have derivation anywhere. It is approached strictly as a similitude one, or in other words, every small part of the set of the curve is always a copy of the initial set. Its length is infinite even though it is found in a finite surface/plane. It has a non-whole number fractal dimension – the fractal dimension is 1.2617 – from a perspective of topology we are partially talking about a straight line and partially about a straight surface/plane. The Koch curve comes to existence by an infinitely repeated process of advance. In the first step there is a simple straight line segment. This line segment is divided into thirds, and above each third a triangle is created

and furthermore the base of this triangle is removed. As a result, we obtain a curve compounded of four line segments. This process is repeated infinitely. Thus, the outcome is a limit, which is repeated into infinity.



Figure 3: Origin of the Koch curve

In practice, we may also encounter the so called Koch flake – which is created by not working with a segment line, but for processing we use a triangle. The result however, is a structure that is finite. In each step of the process the surface is enlarged, but the added triangles are reduced. In other words, Koch flake is infinitely long curve with a finite surface/plane.



Figure 4: Origin of Koch flake

We may also come across many other types of fractals, which often change depending on the author of the definition. For example Sieprinsky curve, Minkowski Curve, Hilbert Curve or Paen Curve.

Fractals and financial time series

It has been examined in the past that time series, especially in the finance markets, have specific features, which can be compared to the rest of time series of remaining science fields. Data resulting out of financial analysis are often available in time series which explain the dynamics of behaviour, mostly in the field of price revenues of shares, bonds, but also within the area of development of salary amount in individual work positions. Data in classic macroeconomical series is examined in monthly, quarterly and yearly periods, but examinations of values of financial time rows are in intervals of hours, minutes and in specific cases, seconds. While analyzing high frequency time series, it happens that data precision and sufficiency is increased. Another characteristic trait are revenues of financial series, which are well explained by the leptokurtic probability division and a diverse extent of value fluctuation of assets and the size of revenue.

These financial data of time series shows periodic trends, stable and non-stable structures, which reflect from market behaviour. We may conclude from this that the largest scale of different trends and structures may be found in the stock exchange, for example in the American stock exchange NYSE or NASDAQ. It is not possible to use classic econometric and statistical methods in this field for this reason of high frequency financial data.

economics is often linked to the field of natural sciences. Even though everything is mainly influenced by the behaviour of the individual, in dependence to his/her emotions or motives, behaviour of society must be modeled by specific processes and it is necessary to recognize the processes. In general, the economy and especially the development of the market has a line of chaotic factors. R.H. Elliot examined this matter around 1947 and he used the hourly data of the New York stock exchange and he was able to explain the behaviour of the market as a whole thanks to this. Thus, the "Elliot" wave was founded.

The Elliot waves show the behaviour of the financial market as a collective whole. Price changes have one element, and that is the fractal. R.H.Elliot was inspired by Charles Down, who simplified the description of the market trend at the phase of accumulation, major fluctuation and surplus.



Figure 5: The Down description of market trend with fractal description of price changes in markets by Elliot

The result of Elliot's research was, that the main basic fractal element may be described as a trend of five waves, which is called impulse, and as a trend of three waves, called correction. A unique system of naming each wave was developed therefore. While naming the impulse waves we use a digit and for the correctional wave we use a letter.





Figure 7: Example of naming of waves according to the Elliot theory

We therefore talk about a basic main model and understanding of the Elliot waves with use on the financial markets. It is possible to finely predict the future market with a sufficiently high probability and success rate thanks to this method. We may mention the scientific work of Robert Prechter as a proof, who predicted thanks to the Elliot wave that there will be a market shift in the American stock exchange and as a result, a depression would arrive in 1987 on Wall Street. A few mocking reactions came from experts, but the prediction was exact not only in pricing, but also in the predicting time. Whoever trusted this could make millions of dollars in the situation.



Figure 6: Photo from the American stock exchange after 1987

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Conclusion

This article concludes basic facts about fractals, fractal geometry and their using in financial area. As stated above, fractal geometry as well as chaos theory are relatively new scientific disciplines, but for decades scientists have been dealing with the issue. It is a geometric tool used to describe various objects in a certain reduction and enlargement. Fractal geometry is associated with names like Karel Weisstrass, Edward Lorenz, Stephen Smale, but N.F.Helge von Koch or R.H.Eliot can be also mentioned. Especially, B.B.Mandelbrot described, gave the name and combined the theory of fractal geometry firstly. All of them took the concept of fractal, fractal geometry from another perspective. Mathematician N.F.Helge von Koch drew up a science work where he described one of the first fractal curves using (called Koch curve) and resulted in a non-intersecting curve that has any derivative nowhere - it has a so-called non-numerical fractal dimension. Since fractal geometry is associated with mathematical series and mathematics at all, R.H.Eliot, who tried to model the behavior of society in harmony with the economy and the natural sciences, was also interested in this question. For his research, he used the hourly data of the New York Stock Exchange. The so-called Elliott wave was formed, which describes the character of the entire financial market as a whole. It follows that fractal geometry is a diverse discipline where every mathematician, scientist can always find his area of interest and he can use fractals not only for studying what the weather will be, the basis for the derivation of curves, but also, if they want to be involved in the stock exchange, as one of the stockbrokers.

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Continuous Ant Colony Optimization for Portfolio Management

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Abstract

Portfolio management, is in fact a bi-objective optimization problem with two conflicting objectives: profit maximization and risk minimization. Investor must compromise between two objectives since both objectives cannot be simultaneously achieved. Therefore, an efficient frontier is determined, for each risk values, if a portfolio cannot provide a better profit for a given risk value, then that portfolio is on the efficient frontier. In this paper, a continuous ant colony optimization approach to solve the cardinality constrained mean-variance portfolio model is presented.

Keywords: portfolio management, continuous optimization, ant colony, metaheuristics

Main Conference Topic: Risk Management, Portfolio Optimization

Introduction

The main mathematical model of portfolio optimization (PO) problem, known as the mean-variance (MV) model, was proposed by Markowitz (1952). This model contains two linear constraints and an objective aiming to minimize risk. Although MV model satisfies fundamental requirements about portfolio optimization, does not satisfy some real life constraints such as enforcing total number of assets in the portfolio and lower/upper limits for each asset. The MV model which includes cardinality constraints was proposed by (Chang *et al.*, 2000) and the mathematical formulation of CCPO is given as follows:

Parameters

N :	number of assets available
μ_i :	expected return of asset <i>i</i>
σ_{ij}	covariance value between asset <i>i</i> and asset <i>j</i>
R*:	expected return
<i>K</i> :	desired number of assets in the portfolio
ε_i :	minimum weight of asset <i>i</i>
δ_i	maximum weight of asset <i>i</i>
Decision variables	
W _i	weight of asset i that is held in the portfolio
<i>z</i> _i :	a binary variable which is equal to 1 if the asset i is held in

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the portfolio, 0 otherwise.

$$\min \Box \lambda \left[\sum_{i=1}^{N} \sum_{j=1}^{N} w_i w_j \sigma_{ij} \right] - (1 - \lambda) \left[\sum_{i=1}^{N} w_i \mu_i \right]$$
(1)

$$\sum_{i=1}^{N} w_i = 1 \tag{2}$$

$$\sum_{i=1}^{N} z_i = K$$
(3)

$$\varepsilon_i z_i \le w_i \le \delta_i z_i i = 1, \dots, N \tag{4}$$

$$z_i \in (0,1)i = 1, \dots, N \tag{5}$$

$$0 \le w_i \le 1 \qquad i = 1, \dots, N \tag{6}$$

$$0 \le \varepsilon_i \le \delta_i \le 1, i = 1, \dots, N \tag{7}$$

Equation (1) minimizes risk while maximizing expected return for different values of λ parameter that is linearly increased from 0 to 1. Equation (2) ensures that the sum of asset weights is equal to 1 while Equation (3) guarantees that exactly K assets are held in the portfolio. Equation (4) imposes the lower and upper limit restrictions for weights of each asset. Equation (5), Equation (6) and Equation (7) defines variable domains.

A Continuous Variant of Ant Colony Optimization

Ant colony optimization (ACO) was firstly introduced by (Dorigo and Gambardella, 1997) to solve the famous travelling salesman problem. Therefore, basically ACO is recommended for discrete problems. For the implementation of the ACO to PO problem, ACO must be transformed into continuous domain, since PO is a continuous optimization problem. Major problem of this transformation is pheromone representation, because ants cannot choose from a particular cluster in continuous domain, hence, representing the pheromone in the form of a table is not possible. Socha and Dorigo (2008)have solved this problem with an approach called **ACO**. The main idea of **ACO** is instead of using discrete probability distribution, using a continuous distribution, that is, probability density function (PDF). In **ACO**, solutions are stored in the solution archive (T) to update pheromone levels. Agaussian function $\mathbb{I}(G\mathbb{I}^i)$ is used as PDF that is parameterized with three factors: ω_i is the weight of the solution s_i calculated with using Equation (8).

 $\omega_j = \frac{1}{qk\sqrt{2\pi}} e^{\frac{(j-1)^2}{2q^2k^2}}$ (8)

where q is a parameter that, when q is small, the best-ranked solutions have strong probability but when q is large, the probability becomes uniform. So we can say that this parameter adjusts the diversity balance between the *iteration _best* and the *best _so _far* pheromone updates used in ACO. The weight ω_l used for selection probability according to the formulation given in Equation (9):

$$p_l = \frac{\omega_l}{\sum_{r=1}^k \omega_r} \tag{9}$$

where p_l represent the probability of choosing the l th Gaussian function. The selection of Gaussian function is done for per ant, per iteration. We used a random number generator to update G^i used normal distribution with μ_l^i and σ_l^i . Values of mean and standard deviation, differ at each construction step, as for step i, $\mu_l^i = s_l^i$ and σ_l^i is calculated by Equation (10).

$$\sigma_l^i = \xi \sum_{\sigma=1}^k \frac{\left|S_{\sigma}^i - S_l^i\right|}{k - 1} \tag{10}$$

The parameter ξ correspond to pheromone evaporation rate in ACO. The ξ value and the convergence speed of the algorithm are inversely proportional. While the rate of pheromone evaporation in ACO influences the long term memory, ξ in **ACO**_{**R**} influences the way the long term memory is used (Socha and Dorigo, 2008). The **ACO**_{**R**} algorithm used in this paper is given in Figure 1.

In CCPO, additional constraints must be handled: K is the desired number of assets in the portfolio and ε and δ represent lower and upper limits of weight of an asset in the portfolio respectively. We used a repair procedure proposed by (Chang *et al.*, 2000) for constraint satisfaction.

Experimental Results and Discussion

The cardinality constraint parameters are used as K = 10, $\varepsilon_i = 0.01$ and $\delta_i = 1$. The algorithm parameters q and ξ fixed **10⁻⁴**, **0.85** respectively. Five market indices used as data sets: Hang Seng (Hong Kong), DAX 100 (Germany), FTSE 100 (UK), S&P 100 (USA) and Nikkei 225 (Japan) were taken from the OR Library.

Algorithm: ACO 1: Input: data (R_i, VC_{ij}) and parameters $(\varepsilon, K, E, na, IT, q, \xi)$ 2: Output:^H 3: S_i : solution *i* in the archive 4: 5: **n**: number of assets available 6: **T**: archive *E*: number of λ 7: IT: number of iteration 8: 9: *H*: set of pareto optimal solutions 10: **NS:** new solution 11: na: number of ants 12: Begin $H = \emptyset$ 13: 14: e = 1 15: Repeat $\lambda = \frac{e-1}{E-1}$ 16: Initial archive $AR = \{S_1, \dots, S_{as}\}$ /*randomly generate an initial archive*/ 17: 1 18: $\omega_j = -$ 19: Repeat Repeat 20: /*The roulette wheel is operated according to the ω $l \leftarrow roulette w heel(\omega, AR)$ 21: values of the solutions in the archive*/ 22: Repeat
$$\begin{split} \sigma_l^i &= \xi \sum_{\substack{r=\mathbf{1}\\ \mu_l^i}}^{\kappa} \frac{\left|S_r^i - S_l^i\right|}{k-\mathbf{1}} \\ \mu_l^i &= S_l^i \end{split}$$
23: 24: $G^{i}(\mathbf{x}) = \sum_{l=1}^{k} \omega_{l} \frac{1}{\sigma_{l}^{i} \sqrt{2\pi}} e^{-\frac{(\mathbf{x}-\mu)^{2}}{2\sigma_{l}^{i}}}$ 25: /*Gaussian function*/ 26: $NS_i = G^i(x)$ Until i = n27: $NS \leftarrow Repair(NS)$ 28: $NS \leftarrow Evaluate(NS)$ 29: 30: /*if necessary update archive and sort nondecreasing order by fitness value */ Until j = na31: 32: iter = iter + 1Until iter = IT33: 34: $H_e = T_{best}$ /*Add the best solution of archive to H */35: e = e + 1Until e = E36: 37: End

Figure 16: ACO algorithm

There are many performance measures used in the literature to calculate errors between heuristic frontier and the standard efficient frontier: Mean and Median percentage errors(Chang *et al.*, 2000), Minimum and Maximum percentage errors(Woodside-Oriakhi *et al.*, 2011), Variance of return error, Mean return error, Mean Euclidian distance (Cura, 2009),

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(Sadigh *et al.*, 2012), (Baykasoğlu *et al.*, 2015). We used Mean Euclidian Distance (MED), Variance of Return Error (VRE) and Mean Return Error (MRE) as performance measures and the equations (12), (13) and (14) represent these performance measures, respectively. Let $(v_i^s, r_i^s, i = 1, ..., 2000)$ represent the risk and return values on the standard efficient frontier and $(v_j^h, r_j^h \quad j = 1, ..., E)$ represent the risk and return values on the heuristic efficient frontier obtained by the algoritm while (v_{ij}^s, r_{ij}^s) represent the closest points on the standard efficient frontier to heuristic frontier (v_j^h, r_j^h) .

$$i_{j} = \underset{i = 1, ..., 2000}{\operatorname{argmin}} \left(\sqrt{\left(v_{i}^{s} - v_{j}^{h}\right)^{2} - \left(r_{i}^{s} - r_{j}^{h}\right)^{2}} \right) \quad j = 1, ..., E$$
(11)

$$\mathbf{MED} = \left(\sum_{\substack{j=1\\ E}}^{E} \sqrt{\left(v_{ij}^{s} - v_{j}^{h}\right)^{2} - \left(r_{ij}^{s} - r_{j}^{h}\right)^{2}}\right) * \frac{1}{E}$$
(12)

$$\mathbf{VRE} = \left(\sum_{j=1}^{E} \frac{\mathbf{100} \left| v_{i_j}^s - v_j^h \right|}{\left| v_j^h \right|} \right) * \frac{1}{E}$$
(13)

$$\mathbf{MRE} = \left(\sum_{j=1}^{E} \frac{\mathbf{100} \left| r_{i_j}^s - r_j^h \right|}{r_j^h} \right) * \frac{1}{E}$$
(14)

Results obtained by $ACO_{\mathbb{R}}$ for all data sets with different **I** values is reported in Table 1. Efficient frontiers obtained by $ACO_{\mathbb{R}}$ on Hang Seng, DAX 100, FTSE 100, S&P 100 and Nikkei are demonstrated in Figures 2-6, respectively.

Index	Ν	K	MED	VRE	MRE
Hang Seng	31	5	0.0000	0.8251	0.3983
		10	0.0001	3.3796	0.8920
		20	0.0005	27.1386	2.2392
DAX 100	85	5	0.0001	4.1655	0.6447
		10	0.0001	14.8508	0.4709
		20	0.0002	35.2857	0.3115
FTSE 100	89	5	0.0000	2.7721	0.0867
		10	0.0000	4.2943	0.3198
		20	0.0001	16.1810	0.2937
S&P 100	98	5	0.0000	6.6976	0.2270
		10	0.0001	5.9751	0.6016
		20	0.0002	22.2402	0.5836
Nikkei	225	5	0.0000	4.6771	0.3462
		10	0.0000	2.1852	0.6590
		20	0.0002	21.9461	0.8255

Table 1: Results obtained by PSO for all data sets with different I values

MED: Mean Euclidian Distance, VRE: Variance of Return Error, MRE: Mean Return Error



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Figure 2: Efficient frontier obtained by **ACO** non Hang Seng data set for different K values



Figure 4: Efficient frontier obtained by $ACO_{\mathbb{R}}$ on FTSE 100 data set for different K values



Figure 3: Efficient frontier obtained by **ACO** on DAX 100 data set for different K values



Figure 5: Efficient frontier obtained by $ACO_{\mathbb{R}}$ on S&P 100 data set for different K values

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Conclusion

In this study, a continuous ant colony based solution approach is applied to solve cardinality constrained portfolio optimization problem. Computational results confirm that the proposed approach is promising to efficiently solve the problem.

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Comparison between social worker with homeless people and teachers regarding their professional competences in education in Germany

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Abstract:

This article should give an overview of the terminology of teachers and social workers with the homeless, with regard to their competences. It, further, tackles their teaching activities and social work with the homeless and their reintegration process. However, the main topics are the competences of both of these professions in Germany: teachers (of a nonspecific school level, for example, primary school, middle school) and social workers with the homeless. There exist projects between pupils and social workers, but unfortunately there are no projects between pupils and the homeless assistance program in Germany. The inhibition level concerning homelessness is sadly still high. The issue, therefore, is not that attractive. The reader should first get a brief overview of the competences of both professions in order to afterwards notice certain similarities, but also differences, so that he may form an opinion about both professions. It is not supposed to be an assessment; it is more of providing the reader with the opportunity of thinking about the complexity of competences of social workers regarding the homeless assistance. Based on a literature of research and the experience of the author as a social worker in the homeless assistance program, the article shows a challenge concerning dealing with homeless people in Germany.

Keywords: teacher, social worker, fields of work, the shelterless, the homeless, people with particular difficulties, competences.

Introduction:

Since the reader of this article is very often confronted with the following terms: teacher, social worker, fields of work, the shelterless, the homeless, people with particular social difficulties according to §§ 67-69 SGB XII; competences, it is recommended to first clarify the meaning. Teachers are persons who not only spontaneously, but also situation-specifically, practice their profession. The term teacher indicates in the republic of Germany this group of employees who are educationally qualified to teach in both general and profession-specific schools. The teaching profession is defined differently among different states, concerning type and level of schooling (Lenzen, 1997). According to Bönsch, the able, the knowledgeable or the master takes over the position of a teacher. Teaching means presenting, modeling, or demonstrating. Learning, on the other hand, means assuming or copying (Bönsch, 2000).

Regarding the social worker: "Social workers are experts in alleviation or, in the optimal case, solution of conflicts in social areas. They support and advise children, teenagers and adults. Social workers are a contact for people who cannot manage their problems on their own. They often work for correctional facilities, youth welfare offices, and debt- and addiction counseling" (Pleye, 2017).

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In the next step, one should clarify the relationship between social working and school education. Here, the following question arises: what are both disciplines about? The answers are the following:

- The social work deals with problems that are seen as societally and professionally relevant. Its goal is: intervention in normative discourses and the enabling of participation in societal resources.

- The school deals with diverse educational questions, with their various interesting topics, for example, anti-bullying programs or the creation of remedial classes, and these indicate the close cooperation between social work and school education. (Rahm, 2011, 10-27). The shelterless: they are, generally speaking, people who have lost their houses, for example through catastrophes like floods or fires, but also through rehabilitation or evictions due to failure to pay rent. These people are shelterless, independent from the question of guilt emanating from losing their homes. This state is an administrative offence that has to be eliminated by the relevant community through providing emergency shelter. This can include, for instance, emergency or compensation housings, guest houses, tents... etc. The person concerned gets an allotment note for those housings and does not obtain a rental contract. Therefore, it deals with license agreement (Lutz/Simon, 2012, pp. 92-94). The homeless: they are people who, other than the shelterless, and in addition to the fact that they lack a home, find themselves in social difficulties. Among many places, they stay, for instance, in compensation houses, or if necessary, on the streets. They often need the support of social workers for reintegrating or rather, according to §§ 6767 SGB XII, integration for people with particular difficulties. The homeless assistance program can support the homeless to deal with their numerous problems in the course of stationary or ambulatory measures. The particular social difficulties (destitute, undersupplying) in this context are:

The particular living conditions have to be obvious or ominous.

These living conditions have to be connected to social difficulties that make living in society very challenging.

The affected person is, moreover, unable to overcome this particular life situation on their own. The homeless are referred to as undersupplied because they have no abilities or competences to independently maintain a life. This undersupply is demonstrated above all regarding:

Housing: the concerned does not have a house secured through a rental contract. They sleep in compensation houses, at friends' places...etc.

Guaranteed economic life situation: the concerned has no regular sufficient income. This results from their own actions or state transfers.

Work and education: the concerned is jobless and did not receive regular education.

Social and cultural participation: the concerned has no social contacts (no friends or family). The particular living conditions of the homeless that are connected with social difficulties can, for example, result from the following conditions:

Lack of or insufficient housing,

Unsecured economic livelihood,

Release from a closed establishment (prison, psychiatric facility...etc.),

Addiction or psychological illness,

Violent living conditions,

Or comparable adverse conditions (Lutz/Simon, 2012, pp. 92-100).

Competences: according to Paschen M./Fritz A, competences are repeatable behaviors that are perceived as promoting success in a certain cultural area (Paschen M./Fritz A, 2014, p.3). According to Eck, C.D., competences is a set of abilities, skills and other characteristics that originally contribute to n a person's ability to effectively overcome complex situations (Eck, C.D., Jöri, H. & Vogt, M., 2007). This includes the following competences: professional

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competence, methodical competence, self-competence, and social competence as irreplaceable (Köhler K./Weiß L., 2015, p.13).

Aim of the article

The focus of this article is on emphasizing the similarities and differences between the competences of social workers in the area of homeless assistance on the one hand and teachers on the other. It is more of providing the reader with the opportunity to think about the complexity of competences of social workers regarding homeless assistance.

Materials and Methods

One can ask oneself: how does a model of a professional teacher's work look like? Thereby, it should be a person/teacher who is taking their profession very seriously. He provides: For a clearly structured teaching process,

For an environment that is learning-supportive,

For transparent performance expectations etc.

According to Meyer, the list of catalog constitutes the teacher profession as follows and gives answers to the asked question:

Professional knowledge: general didactical knowledge, specialized knowledge, and specialized didactical knowledge

Didactic methodical tools: corporative management, clever mediation, individual and general support, fair selection

Professional ethics: reliable relationship work, professional teamwork, work itself (Meyer H., 2015, pp.179-190).

From this, one can derive the most important teacher competences that exhibit a model of the most important teacher competences (see figure 1). In the center of this model one finds the professional self. The professional self deals with the aspect of the own development of the teacher and not with their assessment: bad or good teacher. The professional self is a vessel containing abilities and skills to solve certain problems during class. The professional self needs absolutely metacompetences and teaching competences / specialized competences that should help the teacher solve certain problems related to the class. The metacompetences are related to mental, psychological and social aspects. The teaching competences / specialized competences are competences should serve the management of teaching and learning processes. All competences continually take place just like how certain programs work round the clock on the computer.

The following belongs to the metacompetences:

Professional comprehension – it should serve as a metacompetence for the teacher to identify with his profession

Social reflection – it should play a significant role in terms of conveying the own moral concepts and attitudes towards certain things. In many cases, teachers and pupils do not belong to the same culture or social class. Thereby, it is necessary to consider these aspects for the performance of teaching and to tackle certain questions concerning this. Those questions could be: how can I approach certain pupils? Is my reaction to the opinion of a pupil suitable?

Mental resource management – it is also regarded as "overload protection". This competence describes the distribution of cognitive resources into certain tasks that concern the teacher. This could be engagement for certain pupils, further tasks among pupils, the teacher's private tasks and problems. The following belong to teaching competences / specialized competences:

Monitoring (planning / reaction / reflection) – it can be the short-term planning and adjustment of certain learning situations that describe direct reaction to problems in class and the resulting reflection of class situations.

Didactic adjustment – it describes the adjustment of learning objectives to different learning conditions in the area of content and competences.

Didactic resource management – it describes the election of certain methods, specific teaching procedures and social forms, the employment of EDV etc. Hereby, the competence should help to raise the efficiency of teaching as an opportunity of learning to provide more resources for the direct support of certain pupils.

Contextual and structural transparency – it should facilitate the cooperation between the teacher and pupils during the process of teaching. It enables pupils to better understand the framework of the class and to better assess the teacher. This competence can also improve the relationship between the teacher and the pupils (Köhring F., 2015).



Figure 1: The model of the most important teaching competencies as the basis of good teaching (Köhring F, 2015)

As already mentioned in the introduction, the homeless are characterized by their multiple problematic situations. These are people that have mostly lived on the streets for a long time and that have already made use of some states of the aid system. They have, furthermore, occasionally undergone negative experiences in the same system. They are often old and have problems with legal and illegal drugs, psychological problems, as well as health ones. The bodily hygiene is also an issue of concern. They lacked access to education, therefore their

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situations resulted in unemployment. Many of them have various debts (Lutz/Simon, 2012, pp. 101-104).

In this context, the article raises the following questions: what can be assumed about the competences of social workers in the homeless assistance program? Is there a model for that? In the following, the article refers to an overview of competences of a social worker, according to Hiltrud von Spiegel. This overview will be complemented here and adapted to this model (refer to figure 2): The model of the most important social worker competencies as the basis of good care (Michling), so that one can assess the similarities and differences in the competences of teachers and social workers in the homeless assistance program.

The metacompetences refer to competences in the dimension of professional attitudes and in the dimensions of the own self of the social worker in dealing with the homeless. The specialized competences should serve as an overview of the competences in the dimension of knowledge and methodical action.

The metacompetences are interpreted as the following:

- 1. Competences in the dimension of professional action:
- a) Reflexive working on the professional attitude: reflection of individual career motives, reflection of individual value standards, reflected coping with own emotions, for example, sympathy, fear, compassion, aggression; development of moral competence.
- b) Orientation on professional value standards: acceptance of individual construction of meaning of the homeless, respecting the autonomy and dignity of the homeless, orientating resources of the homeless, appreciation of the homeless, offering democratic fundamental attitudes towards the homeless.
- c) Reflected use of professional attitudes: creation of a professional identity towards the homeless, reflected use of conceptually required attitudes towards the homeless.
- 2. Dimension of the own self (also including "overload protection"):
- a) Ability to use the "person as a tool": ability to achieve self-observation, self-reflection, empathic capacity, ambiguity tolerance

The specialized competences are interpreted as the following:

- 1. Overview of the competences in the dimension of knowledge:
- a) Descriptive knowledge: awareness of methodical approaches towards the subjective truth of the homeless, knowledge about the conceptual pattern of how the homeless perceive reality, knowledge about the effects of the context in the work with the homeless.
- b) Explanatory / specialized knowledge about the homeless assistance: knowledge about fundamental knowledge bases, knowledge about work field-specific bases, knowledge about the social and political involvement of the work field, knowledge about laws and financial basics, fundamental knowledge about organizations.
- c) Value awareness: awareness of the interaction between biographical development and moral orientations, awareness of professional value orientations and guiding principles, knowledge about work field-specific guidelines and the model of the organization itself.
- d) Adjustment awareness: knowledge about work field-specific and methodical concepts, expansion of the methodical repertoire, knowledge of work techniques of teamwork, knowledge of evaluation and research methods.

- 2. Methodical approach:
- a) It is the ability to perform communicative and methodical dealing with the homeless: ability to build a good work relationship, ability to achieve dialogic understanding, ability to accomplish dialogic negotiation, employability
- b) Control of basic operations of methodical actions: ability to perform methodical acting, possession of strategies of knowledge acquisition, ability to achieve resource acquisition
- c) Ability to accomplish effective and efficient designing of working processes: ability to perform conceptual working, ability to accomplish documentation, ability to perform self-evaluation
- d) Ability to perform organization's internal cooperation: ability to perform teamwork, ability to perform collegial advice
- e) Ability to perform inter-institutional and local politic work: ability to perform interinstitutional cooperation, ability to perform negotiation of service, quality and fees, ability to perform intervention in other systems (Von Spiegel, H., 2013, pp.71-100).



Figure 2: The model of the most important social worker competences as the basis of good care (Michling)

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Results

One can draw the conclusion out of both models (figure 1 and 2) that there are several similarities but also differences in the competences of teachers, as well as social workers in the homeless assistance program:

If one compares first the *metacompetences* in both professions (teacher versus social worker in the homeless assistance program), one can conclude the following:

- 1. Understanding the profession and social reflection vs. competences in the dimension of professional attitudes: the willingness and ability to achieve biographical self-reflection are stronger in the social workers with homeless assistance than the surveyed first group, and requires social workers to perform permanent analysis of their own personality.
- 2. Mental resource management vs. dimension of the own self: the teachers, as well as the social workers in the homeless assistance, have to take immense care of their psychological health and need to recognize and assess their own borders. Both specialist groups need to gain a clear understanding of their role in the respective context and monitor results of their methodical procedures. Concerning social workers, the ability to achieve self-observation, self-reflection, empathic capacity, ambiguity tolerance are an important "tool" in order to gain a professional distance from their attitudes and actions. Furthermore, it is often about not exposing oneself to danger. It should be highlighted that one is confronted with a very specific target group: the homeless (low frustration tolerance / high readiness to use violence).

Considering the specialized competences of both actors, it can be said that didactics and methods in various aspects are important in both cases. Eventually, one compares two target groups: pupils and the homeless. The ability to perform inter-institutional and local politic work in the area of social working activities has gained significance of late.

Conclusion

The objective of this article was to draw the reader's attention to the issue of competences of teachers and social workers in the homeless assistance program, in addition to inviting the reader to compare both professions. The comparison has been thoroughly worked out with the aid of researched literature, as well as established experience that the author possesses through working with the homeless. The assistance for the homeless has developed in Germany within recent years from a traditional to a modern service. The expectations of the homeless people have approached the aid system and the social working activities. How will, hereby, the competences of the social workers in the homeless assistance program look like in the future? Further research is needed in order to clearly answer this question.

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Self-Reflection: A Capability to Develop Professionalism in Adult Education

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Abstract

The increasing importance of lifelong learning has an impact on adult educators and in that context, it is important to understand how adult educators can develop professionalism. The article deals with the question of how practical experience and scientific knowledge must interact in order to achieve adult educational professionalism and what role do self-reflection plays in this? These questions are to be discussed with reference to the figure of the "Reflective Practitioner" which was designed in the 1980s by the philosopher Donald A. Schön, to bridge the gap between professional knowledge and real-world practice.

This article discusses the thesis that, in particular, self-reflection supports the adult educator to develop professionalism and to practice innovative teaching behavior to develop and review innovative training designs. The discussion begins with the elaboration of the peculiarities of adult education in the context of lifelong learning. Professionalism and reflection is then examined in more detail followed by the description of the "Reflective Practitioner". The associated implications for the application in the teaching-learning process provide indications for the successful design of learning processes for the learner and the teacher as well as an outlook for future research questions.

Keywords: lifelong learning, adult education, professionalism, self-reflection, reflective practitioner

Main Conference Topic: Adult Education/ Teacher Education

Introduction

In a constantly changing and complex world, individual lifelong learning is becoming increasingly important in private and professional fields. As old structures dissolve, the individual person is becoming more and more responsible, especially in professional fields regarding personal and educational factors influencing "employability". But lifelong learning is important for other reasons as well. By improving people's ability to function as members of their communities, education and training increase social cohesion, reduce crime, and improve income distribution. (The World Bank, 2003; Kuit, Fell, 2010).



Schober, Klug, Finsterwald and Spiel (2016) position the term "lifelong learning" originally in the context of social and educational discourse, which is primarily concerned with overcoming the challenges of the knowledge society. In their perspective, lifelong learning focusses on the continual development of individual competencies in the course of various professional, technical and social changes. From an educational psychology perspective (despite the diverse literature) lifelong learning can be understood, regardless of age and specificity, as: (1) the motivation for and the interest in education (learning motivation, intrinsic and extrinsic), and (2) the competence, to apply these successfully in concrete learning situations. In this context professionalism and reflective learning both play an important role not just for the adult learner but as well for the adult educator to further develop his professionalism. How practical experience and scientific knowledge must complement each other, so that adult educational professionalism emerges, and what role do self-reflection plays in particular for innovative teaching behavior, is what will be introduced in the next parts.

Professionalism in the context of adult education

Anita Pachner (2013) refers to the origins of the concept of professionalism and its meaning to outline professional adult education and its requirements. In the 1980s Hans Tietgens brought the term "professionalism" into the adult educational discussion (ibid.; Gieseke, 2011). He defines professionalism as the ability to be able to adapt broad scientific knowledge in concrete situations or vice versa, in these situations, to recognize which components of knowledge can be relevant. It is about to discover the general problem in the specific case. The task is to establish always relations between learned generalizations and the specific situations (Tietgens, 1988). For him it is essential to relate science and practice, general and particular, scientific knowledge base and the requirements of concrete, adult educational situations. Gieseke adds that professionalism relies on knowledge base, which is evaluated by experiences. It does not come from the planned procedure, but of special task solutions, interpretations, diagnoses and should be made by individual responsibility (Gieseke, 2005). She points out the importance of experience for the situation-appropriate practice of scientific knowledge in a complex problem and the individual responsibility of the following situation-specific practice.

Professionalism covers the relevance of theory and practice, which means the interpretation of new situations based on scientific knowledge. Through the scientific knowledge the professional experience will be differentiated. Also, professionalism must be proven again in any professional situation expressed by performance. In summary, the term professionalism in contrast to professionalization means no longer only occupationalisation, but a differentiated approach with specific research findings. Professionalism thus includes the competent, flexible use of knowledge in practice, as well as diagnostically and flexibly network acting (cf. Gieseke, 2011).

On the basis of the theoretical foundations and on the basis of the empirical findings and observations, a model was developed which illustrates how in specific situations, scientific and experience knowledge can emerge professionalism. This model leads to the question what capability supports the process to develop professionalism? Self-Reflection is one of these capabilities and will be discussed in the next part.



Figure 1. Integrated model of development of professionalism (own illustration)

The particular importance of self-reflection for learning, innovation and teaching

In the definitions of adult educational professionalism, reflexivity has repeatedly been mentioned as an important condition. But what is meant by this? Reflectivity is often considered a partial competency of the personnel competence (cf. AK DQR, 2011; Wba 2012). In the German Qualifications Framework for lifelong learning, it is described that reflexivity includes the ability, to manage changes, to learn from experiences and to think and to act critically (AK DQR, 2011). Also in this not genuinely adult educational document the aspects dealing with change and learning from experience play a special role. Self-reflection, so the thesis presented in this article is thus a central capability for experiential based learning, for change and development, and thus also for innovative teaching and professional, educational activity as a whole which leads in summary to professionalism. In this context self-reflection has three essential functions (Tisdale, 1998):

- It should help, to adapt thinking and acting, which is not effective in a given situation.
- Self-reflection assists in the comparison of experiences with own thinking and acting. In this case experiences are seen as learned and proved ways of thinking and acting in concrete situations, but can also be seen as the result of earlier self-reflective processes.
- Based from these processes of analysis and assessment, self-reflection structures as well the future thinking and planning. Self-reflection thus enabling to check one's own thinking and doing, on the basis of situational appropriateness and, if necessary, to change them.

The categories for assessment of situational adequacy provides, besides the degree of achievements of past thinking and doing, the basic scientific knowledge. Experience alone is not enough. On the contrary, Siebert (2011) points out with regard to results of classroom research, that long-term practice experience hinder reflection rather than supports it.

Stangl (1997) describes that reflective learning is based on problem-solving action, because the reflection cannot end in simply finding a solution approach, it must continue and engage with an implementation of the intended solution. This means a concrete new behavior must be performed and then critically evaluated. Consequently, reflective learning must be learned. Yet this type of learning is hardly taught in traditional forms of schooling, which, given the focus on teaching and questioning content, do not encourage the implementation of this knowledge in concrete problem situations. In the case of reflective learning, the learner focuses on personal competency development, meaning that learners define individual



problem by developing different approaches to a solution, which can then be applied and assessed in everyday life. This results in the gradual development of problem-solving competence, which cannot be represented and presented in theoretical knowledge alone (ibid.).

John Dewey (1997) developed an early conceptualization of reflective learning, which has encouraged the sensible handling of pupils' experiences in learning contexts within the fields of reform and traditional pedagogy. In doing so, he attached an importance to the shared and sensitive reflection of these experiences.

Donald A. Schön (1987) further developed the term reflective learning in the context of education and training as he addressed the question of how people, who have acquired theoretical and systematic knowledge at universities, can learn and develop themselves in the partially complex and unsystematic practice environment. While it is best to learn the standardization of procedures for clearly defined practice situations, it is often necessary to analyze the underlying complexity of difficult everyday situations in order to develop adequate solutions. For these situations, an unreflected application of standardized procedures often results in low-quality solutions, whereas a reflected and differentiated analysis of the situation, taking into account all possible perspectives, has a greater prospect of adequate solutions and thus improved results.

The cyclic reflection model most frequently used today in adult education is Kolb's four-phase model (1984), which is based on a concrete experience (phase 1) and its deepened perception, and reflection including all those involved (phase 2), a new and more differentiated understanding of the situation, but also of one's own learning needs (phase 3). Among the included perspectives are subject factors (such as mental concepts, affective factors, cultural influences, etc.). On the basis of the conclusion made by reflection, a new experience can be planned, implemented and, if necessary, reflected again (phase 4). Reflection is used in the formation of adequate professional skills and attitudes, as well as in general in learning practice. The area of self-reflection is well established in education. Current research attempts to apply findings gained in traditional western classroom contexts to other cultures as well as subject domains, such as science and health education (Wang, Chen, Lin, & Hong, 2017; Mirlashari, Warnock, & Johanbani, 2017).

Reflection is a comparative process of thinking with the aim of discovering the past, which are used for future decisions and future action. Self-reflection focuses this thinking on the reflective person himself - his own acting in the past with its prerequisites and consequences will be one analyzed and compared to the targeted objectives and the degree of achievement. The conclusions from this process provides a basis for following actions. Thus, self-reflection is a learning process and a basic principle for personal development. This is especially true in the professional field - and here again in a special way in educational professions: responsible and responsible action is not at all without the corrective accompanying reflection conceivable. A special concept which builds on these ideas is the "reflective practitioner" by Donald A. Schön.

The "Reflective Practitioner"

Against the background of a waning confidence in the capacity of professional knowledge and professional expertise, Donald A. Schön introduced 1983 the concept of the "reflective practitioner". With this concept, he postulates the need for adaptability of professionals. This is required because of increasing complexity, insecurity, inconsistency,

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uniqueness and conflicting values in occupational situations (ibid.). The skills and techniques of traditional expertise are no longer sufficient for this new professional practice.

This finding is consistent with statements of e.g. Erpenbeck and Rosenstiel (2007), who see competencies as self-organization as a prerequisite for action in open situations. This means it is important to have a holistic view on the capability of professionals beyond just stressing the expert knowledge. Schön further assumes that the professional action is based on implicit "knowing-in-action", which he describes as "ordinarily tacit, implicit in our patterns of action and in our feel for the stuff with which we are dealing" (Schön, 1983, p. 49). In order to deal successfully and competently with complex, open situations, it is necessary, to reflect on this knowing-in-action and thereby try to explain it. Knowing-inaction becomes through this description to the knowledge-in-action, it loses its dynamic moment (cf. Schön, 1987). Schön (1983) speaks of a "reflection-in-action" process, when the reflection during the course of the action takes place or respectively, of "reflection-onaction", if it follows in retrospect (Schön, 1987). Both processes of reflection are triggered by unexpected results of own actions, so to speak, the occurrence of an unexpected event (ibid.). Things of reflection are diverse: The practitioner "may reflect the tacit norms and appreciations which underlie a judgement, or on the strategies and theories implicitly in a pattern of behavior. He may reflect on the feeling for a situation which has led him to adopt a particular course of action, on the way in which he has framed the problem he is to solve the problem himself within a larger institutional context" (Schön, 1983, p. 62). Reflection is considered as the central prerequisite for dealing with complex and divergent situations. By questioning of proven assumptions, a new understanding of the situation and development and implementation of new action alternatives, reflection supports the adult educator to understand the open situation and to manage it adequately (cf. Schön, 1987; Wolcott, 1995).

Similar to Tietgens (1988) for adult education, Schön considers, systematic, primarily scientific knowledge and its application to specific situations as characteristic for competent, professional action (cf. Schön, 1987). Based on the assumption that there is not for any practical problem a correct answer or rule in the pool of professional knowledge, the ability to "reflection-in-action" becomes an important condition for professional action, especially in open, uncertain situations. "Reflection-in-action" then becomes a source of new knowledge and creates new "knowing-in-action" beyond research and science (ibid.).

Results and Discussion

In summary, it can be said that adult educational professionalism requires besides experience knowledge, also scientific knowledge to differentiate between professional and practical knowledge. In particular, it has been shown, the capability of self-reflection is an important prerequisite for this. It allows the adult educator to show appropriate, innovative teaching behavior, instead of remaining in his own practical experience and knowledge. Further it is interesting to investigate the question, how self-reflection can be practiced and trained? An indirect support is conceivable by offering methods and instruments for practical self-reflection, e.g. learning diaries and portfolios (cf. Pachner, 2009). In the following a "reflection question tool" (Kellenberg, Schmidt, & Werner, in press) will be introduced which can assist the adult educator to self-reflect in specific professional situations and thus further develop his professionalism.

The "reflection question tool" is by no means comprehensive, but provides ideas and direction for further consideration as a tool for educators, trainers and teachers to do like Schön suggests the "reflection-in-action", "the-reflection-on-action" and adds a third aspect, the "reflection-before-action". In terms of designing and delivering innovative trainings,

these three reflection aspects can support the adult educator to deal successfully with a complex and changing environment.

Table 1. Reflection ques	ion tool (adapted from	Kellenberg, Schmidt,	& Werner,	in press)
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Reflection-Before-Action		Reflection-In-Action		Reflection-On-Action			
Plan		Monitor	E	Evaluate			
Adult Educator Perspective							
What choice in terms of topics can be offered?	What is the goal of the task?	Are the strategies offered effective for this task and the adult learner?	How well did my approach work for the adult learner?	When else could I use this approach? How could I improve this approach?			
What are the possibilities to introduce further personal topics?	What strategies are most effective with this type of task?	Is this an interesting lesson/task for the adult learner?	How much effort was required to complete the task?	Did the adult learners achieve their goal?			
To what extent is the adult learner free in planning, timing, process etc.?	What do I know about the target group? What useful skills do they have or need?	How am I feeling as I work on this task? What is my level of confidence?	How did the adult learner stay motivated?	What did I learn about this topic/task/target group?			
What needs can be satisfied within the learning process?	Does this task require a great deal of concentration and effort?	How supportive is the learning environment?	How did the adult learner remedy the problem(s)?	What would I do different next time?			
What is the personal freedom of work within the required tasks?	What kind of study conditions are best for meeting the requirements and support the adult learner?	What outside materials or resources should be added?	Did the adult learner enjoy the task? Yes or no and why?				
Adult Learner Perspective							
What choice in terms of topics do I have to offer? What is my motivation about the task?	What is my goal of the task?	Do I understand what I am doing? Am I making progress toward the goal?	How well did my approach work for the adult learner?	How do I feel about the outcome?			
What are the possibilities to introduce further personal topics?	What useful skills do I have or need?	Is this an interesting lesson/task for myself?	What did I do when strategies didn't work?	Did I enjoy this work?			
To what extent am I free in planning, timing, process etc.?	Does this task require a great deal of concentration and effort?	How am I feeling as I work on this task? What is my level of confidence?	Did I encounter any unexpected obstacles in completing the task?	Did I achieve my goal?			
Can I satisfy my needs within the learning process?	What do I need to feel comfortable?	Am I planing appropriate time for the adult learners to work on the task?	How did I remedy the problem(s)?	What did I learn about myself?			
What is my personal freedom of work within the required tasks?	How do I feel about this kind of task? Do I like this kind of work?		Did I enjoy the task? Yes or no and why?				

In addition, the "reflection question tool" offers sample questions in three areas: plan, monitor, evaluate. These can be assigned to the different reflection aspects "reflection-before-action", "reflection-in-action" and "reflection-on-action". Furthermore, the reflection questions are divided into two sections, the section "adult educator perspective" which focuses on the learning task and the adult learner. The second section "adult learner perspective" focuses on the adult educator as a learner and especially supports self-reflection. This emphasize the different roles the adult educator can take on in a learning process and therefore to reflect in terms of themselves as educator and learner.

The "reflection question tool" can be regarded as a practice oriented tool for personal development and based on this to develop professionalism. As next steps, it is necessary to research on (1) using and testing of the tool in practice, (3) review of the tool, (4) validation of the tool in case studies, and (5) feedback to practitioners. In addition, it seems to make sense to better integrate the learning of self-reflection into academic education as well as in vocational education and training for teachers and adult educators.

Conclusions for continuous development of adult educator

In this paper, the characteristics for successful adult educational professionalism were described and a model were introduced to illustrate how, in a specific situation, scientific and experience knowledge can lead to professionalism. Based on this self-reflection was introduced as a capability to assist the adult educator to develop professionalism. With reference to Schön's model of the "reflective practitioner" a simple "reflection question tool" was developed which can be seen as a basic tool to support developing into the "reflective practitioner" role and further more to develop the adult educational professionalism.

It is hoped that the understanding of the topic reflected in a pragmatic "reflection question tool" will influence not only ideas of what adult learning means, but also conceptions of what it means to teach and to develop professionalism. Adult educators must be actively engaged in their teaching, own learning and knowledge building; they must be able to effectively direct the adult learners and their personal quest for knowledge and skills, to assess and evaluate for understanding, and to know what to do when the adult learner (and themselves) need more information. A major function of all schooling must be to help create adult educators and adult learners who know how to learn through self-reflection. By fostering the development of self-reflection as a capability and a prerequisite of lifelong learning, it is hypothesized that this goal can be achieved.

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Gil Rieger studied Intercultural and International Management for his bachelor degree and International Business Administration for his master degree at the University for applied Management. Since 2015 he has been a doctoral student at the Riga Teacher Training and Educational Management Academy and is working as a teacher for communication, presentation, visualization, moderation and team development. His dissertation focuses the improvement of learning performance and learning success. Furthermore, he has international experience in China and has been working for a consulting company in Munich.



The anxiety patient in everyday dental practice: Empirical characterization approaches to increase patient satisfaction

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Abstract

A growing number of dentists in Germany combined with a virtually stagnating population figure causes a drop of the quantity of potential patients per dentist. In this respect only a well grounded marketing strategy in which patients' needs are satisfied best canpreserve the competitiveness. Besides determining these needs, this study aims on investigations of connections and correlations between patients' attributes concerning specific needs and expectations on dental surgeries and dentists observed on a dental surgery in Munich. At the center of research is the anxiety patient as a separate patient group Editing statistical data, which was gained within a patient survey provides basis for interpretations of descriptive statistics and groundwork for inductive correlations.

As a result, a variety of different characterization features can be recognized, which distinguish an afraid patient from a potentially less afraid patient. The knowledge of a physician about these differences between individual patient groups is important to increase customer satisfaction.

Keywords: anxious patients, dentist, patient satisfaction, patient retention

Introduction

" Der Kranke traut nur widerwillig, dem Arzt, der's schmerzlos macht und billig. Laßt nie den alten Grundsatz rosten: Es muß a) wehtun, b) was kosten." (Sitte, 2015) (An ill person trusts a physician who treats cheap and painless only reluctantly. Always bare this old principle in your mind: A treatment has to have a certain price and must be painful). Following the poem by Eugen Roth from the year 1895, a successful one dental treatment goes along with expenses and pain. Over 100 years later, this view seems to be completely overhauled. Potentially painful treatments become tolerable due to to modern local anesthetics and tooth supplementary insurances are effectively avoiding unwelcome costs. As measured by the data of the Kassenärztliche Bundesvereinigung, an increased number of dentists in Germany can be observed in combination with a decreasing total population in Germany (KZBV, 2014)

For a dentist as an entrepreneur who has to assert himself in the competition field, patient satisfaction is the center of success as a factor of customer loyalty. In the following, a special patient group is investigated more closely. The specific personal requirements of potential afraid patients as a own subgroup are evaluated and compared with other groups.

Since anxiety patients represent a considerable proportion of the daily patients of a dentist, the knowledge about specific requirements for this patient group for a dentist does not appear to be negligible. Every tenth patient suffers from such a pronounced phobia before dental treatments that *the* dentist's visit is completely omitted (Soldan, 1999). The dark figure, of



those patients who do not have a more or less pronounced anxiety, can be estimated with about 20% of the patients (Sergl/Müller-Fallbusch, 1989). For a dentist it would be of great interest to know to what extent a Patient is frightened or concerned about the upcoming dental treatment. Herefore knowing special and maybe very own characteristics of this patient group could improve the treatment as well as customer (patient) satisfaction. Targeted communication and education for the reduction of anxiety can as a measure relieve the treatment for both sides. In addition to the investigation of the needs of an anxiety patient, the focus of this work is the investigation of interrelations/correlations between patient characteristics and subjective wishes or expectations of a dental practice as well as to the dentist himself. The market / patient research which is the basis for this work is to find out what actually satisfies a patient in a dental practice and on which criteria, sometimes, fall cords are anchored, which in turn meet unsatisfied needs.

Aim of the study

The aim of the study is to filter characteristics of potential afraid patients and put them into statistical contrast with other patient groups.

The findings and further correlations that are made within the framework of this article form a section of a diagnosis-oriented analysis. Within the already defined praxismarketing, the information gathering thus represents the first stage for the formation of a patient-oriented, strategic overall concept (Börkircher/Nemec, 2009).

Materials and methods

The market research is based on a patient survey carried out in the dental practice at the Glockenbach (Munich) in the period from January to April 2017. The total sample size is $n_1 = 212$. In this context, a partial population of 79 patients (sample n_2) could be identified as potentially anxious. The collection, evaluation and further correlation analyzes are carried out with IBM SPSS Statistics 21. By aggregating data as well as generating standardized residuals, the data set was extended to a total of 19,497 individual features, which were subjected to error control. Missing and / or faulty responses were identified with the feature expression "999" and are identified as "missing values" within the analyzes.Microsoft Excel 2010 was also used for further visualization of analytical data.

In a first step, the primary target group (n2) was determined (Figure 1):



Figure 17: Share of anxiety within research group (n1)


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Results

In the following, it is to be determined whether the "typical" anxiety patient is based on specific characteristics, or whether the feature of anxiousness is entirely independent of external influences.

In the context of various correlation analyzes of the questionnaire data, a significant correlation between the gender variable and the "measure of anxiety" variable could be analyzed using the Chi-square test.

		Sex		Total	
			Female	Male	
	Highly afraid	Quantity	27	13	40
		Expected Quantity	19,3	20,7	40,0
	Occassionally afraid	Quantity	26	11	37
Share of anxiety		Expected Quantity	17,9	19,1	37,0
	Less afraid	Quantity	29	49	78
		Expected Quantity	37,7	40,3	78,0
	Unafraid	Quantity	19	35	54
		Expected Quantity	26,1	27,9	54,0
Total		Quantity	101	108	209
		Expected Quantity	101,0	108,0	209,0

Table 2: Cross-classified table - Anxiety vs. Gender

The insight of the descriptive statistics already provides clear differences between men and women. (Table 1)While men are generally less fearful than expected in all responses, a mirror-image-disparate picture emerges within the group of women. This finding is supported by the result of the Chi square test, which gives a highly significant result with 0.00% (Table 2).

	Value	df	Asymptotische
			Signifikanz (2-
			sided)
Chi-Quadrat nach Pearson	20,639 ^a	3	,000
Likelihood-Quotient	21,029	3	,000
Zusammenhang linear-mit-	16,037	1	,000
linear			
Anzahl der gültigen Fälle	209		

Table 3: Chi-Quadrat Test - Anxiety vs. Gender

To what extent this result can be interpreted under the magnifying glass of the social desirability of answers remains open. In some circumstances, men who are commonly referred to as the "strong sex" tend to be more likely to be more reluctantly untrue than they actually are.

In the following, it was assumed that patients who are for a potentially painful treatment in practice tend to be more likely to be an anxiety patient than those who had an appointment at the time of the questionnaire survey only for a routine examination. However, with a



significance level of p = 0.73, this null hypothesis could not be proved statistically. There is therefore no link between the degree of anxiety and the potential pain to be expected during a visit to the dentist.

Furthermore, no significant results were found between the variable age class and the measure of anxiety. The Chi-square test gave an alpha value of 62%. There is therefore no significant relationship between the age of a patient and his potential anxiety.

However, a significant correlation between the degree of anxiety and the number of previous appointments / visits (in) practice could be determined (Table 3), which could be proved by means of a reability analysis. The following cross-table also shows that the degree of anxiety seems to decrease with increasing number of visits to practice:

Dimension of anxiety	Average amount of appointments
Highly afraid	2,75
Occassionally afraid	3,2
Less afraid	3,9
Unafraid	5,1

Table 4: Results: Dimension of anxiety vs. Average amount of appointments

With regard to the question "What is important to you in the selection / retention of your dentist", significant differences between potentially anxious and potentially less anxious patients could be identified. (Multiple answers allowed, Table 4). With a significance level of 3.8%, a correlation between the variables anxiety and reason for the selection of the dentist could be proved.

Factor	Potentially afraid patient	Potentially unfraid patient
Sympathy for the dentist	89%	65%
Cost of treatment	11%	23%
Recommendation of friends	70%	52%
Ambience of doctors office	33%	39%
Evaluation in an online	64%	72%
plattform		
Distance to doctors office	5%	49%
Gender of doctor	31%	28%
Age of doctor	55%	51%
Opening hours of practice	44%	40%
Waiting time in waiting room	32%	65%
Possibility to brush teeth	80%	78%
Magazines / TV / WLAN	23%	32%
Duration of treatments	66%	74%

Table 5: Results: What is important to you in the selection retention of your dentist

From this it can be concluded that a potentially anxious patient places less emphasis on taking a further path to practice. There are also differences in the variable sympathy factor for the dentist. Sympathy appears to be more important for anxiety than for potentially less anxious patients. There are also numerical differences in the selection of the individual factors of a dental treatment, which are perceived to be subjectively important. Furthermore,

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anxiety patients appear more patient with regard to waiting times in the waiting room, which is obvious through a numerical difference to the comparison group.

In the course of the treatment itself, numerical differences between the comparison groups were found. At the center of the analysis is the question "How important are the following factors in treatment"? (Figure 2, Figure 3)



Figure 18: Results of afraid patients: Importance of assorted factors of a treatment



Figure 319: Results of unafraid patients: Importance of assorted factors of a treatment

There are particular differences in the variables of the diagnosis of possibilities to improve dental health as well as information of cost of treatment and explanation of single steps during treatment. While potentially more anxious patients tend to place greater emphasis on the precise explanation of the individual steps of treatment, the cost of treatment for less anxious patients appears to be of greater importance. Anxious patients tend to be more likely to be enlightened about ways to improve their dental health than to the comparison group of less anxious patients. No significant correlations were found in the statistical evaluation of the following variables between the test group "anxiety patient" and "unanxious patient"

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- Preference of appointments on Saturdays
- Temporal preference of a dentist's appointment
- Willingness to wait in the waiting room at the given date

A further significant result (p = 0.02) provided the evaluation of the variables "waiting time for the next free appointment" (appointment agreement) between the test groups "anxiety patient" and "unanxious patient". While potentially anxious patients are willing to wait for 28.4 days for the next free appointment, unanxious patients are only ready for 20.1 days. A possible interpretation is that an anxiety patient tends to shift the distressed evil of the appointment as far back as possible.

The results presented in this study represent only a fraction of the correlations analyzed. In some cases, no significant correlations were found. However, it has been shown that the typical anxiety patient is characterized by a few characteristic features. In essence, it should be noted that women are more likely to be classified as anxiety patients than men. However, this result should be considered taking into account the social desirability of responses while respecting the fact that men should be considered as the strong sex. Furthermore, it could be determined that the number of dental visits already taken has a direct positive influence on anxiety. This result, however, is to be enjoyed with caution, since in the present test only one doctor acts as a "basis". Rather, it is conceivable that a potentially "brutal" and little sympathetic physician might also have a negative influence on the feeling of anxiety.

Within the framework of the question "Which factors play an important role in the choice of your dentist", significant differences between anxiety and non-anxiety patients were identified. In particular, it is important to note that anxiety patients are generally more willing to take a long journey to your dentist than the comparison group. Although the sympathy factor of the dentist and possible recommendations from friends in both groups were classified as very important, there are nevertheless numerical differences: in the group of anxiety patients, both factors were assessed as more important.

Also with regard to various factors in the treatment anxiety patients have different preferences. In particular, the explanation of the individual steps of the treatment appears to be especially important, while the costs of therapy are offset in the background.

Conclusions

As already shown, the focus of our customers is also on the part of dentists. The market research, which is the basis for this work, offers as a marketing tool the possibility of better understanding of patients and their needs and, in the end, of patient satisfaction. Even if the results presented already provide some indication of the characteristics of an anxiety patient, it should be remembered that every person has his own needs and desires. An extensive information discussion before the treatment is therefore advised.

Discussion

In principle, however, it does not appear to be sufficient to focus on specific groups of patients (here the anxiety patient), but rather to create a holistic picture, which provides an all-round view of all patients. Due to the fact that the patient questionnaire is restricted to the patient 's own patient group, a subsequent questionnaire, which would also provide further information in another practice which would be ready to do so, could provide an answer to the question of how the current practice quality should be incorporated into the competitive comparison At which points there may be strong deviations and increased optimization requirements. The trend of concentration on generation 50+, which is currently growing in

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other sectors (banks, tourism, trade), should also be taken into account in the dental industry. Such a strategic orientation could be justified, in particular, by societal changes (demographic change), a growing creditworthiness of patients of higher age, changes in the mobility of patients, and a growing sense of values and health.

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Target-oriented communication to increase learning performance and learning success

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Abstract

Communication is an essential aspect of teaching and learning. Both the lecturer and the learner communicate with each other verbally and non-verbally. In order to pass on information, focused communication is indispensable for teachers, trainers and consultants. This article describes how effective communication is able to improve learning performance and learning success. Therefore these terms will be defined and, in addition, tools will be presented which influence communication positively and help prevent communication problems. The section "Related Work" deals with the basic models and techniques of this article. Afterwards the methodology will be explained and the chosen way of research is shown. Finally, links between learning performance, learning success and communication tools are illustrated.

Keywords: learning performance, learning success, communication, teacher, learner, consulting

Main Conference Topic: Education, Teaching, Learning and E-learning

Introduction

This article relates to the field of didactics, specifically about teaching and learning aspects. The focus is on analyzing the improvement of learning performance and learning success. These aspects are can be indicators of how effective during the process of learning and teaching has been communicated. A remarkable diversity exists in current literature regarding the topics of learning performance and success. Because of this, a consistent definition will be adopted as a basis for this work. The subject of communication which is able to support the transfer of information, the acquisition and the converting of knowledge will be discussed in this thesis. In addition, a connection to which supporting elements can be transferred to the improvement of learning performance and learning success will be investigated.

Improper communication influences learning and teaching processes in a verifiable way and thus has significant influence on the aspects promoted in this paper (Wieselhuber, 2013). The problem which is discussed in this work is the following: Non-targeted communication results in negative effects. It is necessary to prevent these effects and to identify possible solutions. These negative effects not only impact teaching and learning processes, but also have a strong impact on the relationship level in consulting, which also involves the transfer of knowledge (Wegmann & Winklbauer, 2008). In everyday business, lack of communication can also lead to that the customer expecting a different service than what was promised

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(Hensen, 2016). Overwork and conflict may also result due to a lack of communication (Lippe, 2015). Proper communication is the most efficient information medium throughout both the professional and private sectors (Simon, 2007).

Basic communication tools

In the following section, potential communication tools will be presented which will then be linked to positive effects on learning performance and learning success. For the didactic implementation of a suitable communication level, the addressee analysis is a tested means. However it is not enough only to know the age and preferences of the learner, as more specific features are crucial (Niegemann, et al., 2008). For example, prior knowledge, information or expertise may be assumed to exist. This information is important in order to avoid possible boredom or overburdening, as well as to adjust informative and communicative elements (Niegemann, et al., 2008).

Another aspect can be the individual's learning history. This means which learning requirements the learners have dealt with previously. It is necessary to distinguish whether it is an already known field of information or one which is entirely new (Niegemann, et al., 2008).

Educational background also has an impact on the communication to be chosen. Conclusions may be drawn about general knowledge and an appropriate language style for the transmission of the information can then be chosen (Niegemann, et al., 2008).

Information about learning motivation also allows important conclusions about the participants. Although there are different principles for the analysis of motivation-promoting elements, a distinction is now made between intrinsic and extrinsic motivation. Intrinsic means the learner decides by himself to take on new information or knowledge, whereas extrinsic is more motivated by external factors (compulsory). This distinction has influence on the design of the learning program and communication (Niegemann, et al., 2008). In addition, possible consequences for success or failure may affect the approach, such as whether the learning process is seen as an opportunity or if consequences are expected for failure (Niegemann, et al., 2008).

Further criteria for adapting communication based on an addressee analysis are objectives, learning styles, and intercultural aspects. Objectives have an influence on which communication is encouraging and how the intelligibility can be better underlined by appropriate examples. Regarding learning styles, evidence shows that the process of knowledge appraisal can be supported by certain preferences. However, intercultural aspects must not be neglected in communication design (Niegemann, et al., 2008).

Listening techniques can also be extremely helpful in improving communication. A distinction is made here between passive and active listening. The main focus in this work is on active listening while passive listening is only briefly mentioned. With passive listening, one expresses a willingness to listen, but active listening additionally suggests that the message was understood. Effective listening provides important information and expresses appreciation while avoiding misunderstandings (Simon, 2004).

Passive listening is made clear by nodding the head, holding eye contact, and turning the upper body towards the speaker (Simon, 2004). These are indications that a suitable communication level has been selected. In comparison, attempting to change the conversation



theme, interrupting or signaling boredom are all indications that the information may be irrelevant for the listener (Simon, 2004). Active listening goes beyond passive listening. This clearly signals that there is an interest in communication, and the focus is on information absorption and knowledge enhancement. Such signals can occur either verbally or non-verbally (Simon, 2004).

The learner indicates that the new knowledge was understood by paraphrasing it, reproducing the information in their own words. This shows that the essential content arrived and the communication is focused on the core elements of the topic. This enables the knowledge provider to determine whether the information has been communicated appropriately or whether the provider must intervene (Simon, 2004).

Summarization is used to present core statements and carry out interim results. This is particularly useful for very long periods of communication where the main topic may be disregarded unintentionally. When this summary is demonstrated by the knowledge taker, one can suppose that learning performances and learning successes already manifested (Simon, 2004).

It is not uncommon that a statement does not arrive correctly to the addressee. By using clarification, the sender determines whether his statement arrived correctly. The receiver additionally makes clear by clarifying feedback whether the statement was correctly recorded and also signals interest in the information. If misunderstandings occurred, both sides now have the possibility to clear them up. The present clarification of a misunderstanding is better than one in the future (Simon, 2004).

Through the intellectual continuation of the conversation, a partner shows a lively interest in the active participation of the communication. Such feedback leads to different points of view regarding situations or problems and suggests successes in learning performance have been made (Simon, 2004).

Weighing up is used to connect statements of the conversation partner or to compare contradictory theses. It is important to clearly point out the core statement of the conversation partner and to name possible alternatives. This makes the core statement more precise and possible decisions can be made (Simon, 2004).

By asking questions, communication may be understood and knowledge thereby adopted. The communication partner is strongly involved in this process which provides further benefits. Questioning techniques support achieving goals, receiving information and stimulating cognition (Simon, 2004). Questions are especially a strong part of communication in a teaching/learning environment.

A differentiation may be made between closed and open questions. With closed questions, the responder has the opportunity to answer using short phrases or a single word. Closed questions focus on desirable information as well as quickly solving problems. Open questions, on the other hand, always contain a question word which forces the receiver to give a complete response. Open questions are also suitable for receiving detailed information and the responder is given the possibility to influence the direction of the conversation (Simon, 2004).



One example of closed questioning is the alternative question. The responder must decide between two alternatives. This has the background that a possible third answer is not taken into consideration and you get quickly to the point (Simon, 2004). Insinuating here also the promotion of the learning performance and the learning success, you could assume that the targeted appropriation of limited response possibilities supports the learner's decision to a correct answer.

The control question is also seen as a closed question. With this question it is possible for the questioner to determine whether the information arrived correctly, or whether there are areas that need to be clarified further. As previously mentioned, it has been found that it is beneficial to discuss misunderstandings promptly (Simon, 2004). Interestingly, the control question and the questioning technique of clarification can be connected very well. With the control question you have the possibility to verify newly transmitted knowledge while the clarification technique provides instant feedback as to whether the information was recorded correctly.

The rhetorical question falls under the category of open questions. With rhetorical questions, answers are already implied and thought-provoking impulses will be given (Simon, 2004). These impulses make information processing a key element. The question that arises here is whether reflecting or thinking with a different approach to what has been learned leads to the consolidation of knowledge and thus to the support of learning success and learning performance.

Now that communication techniques for improving and supporting learning performance and success have been demonstrated, models which analyze communication in its entirety will be shown. Here the models of Friedemann Schulz von Thun, Claude Shannon and Warren Weaver will be presented.

The communication scientist Friedemann Schulz von Thun assumes that a message contains four different sides. Using this assumption he further enhanced Karl Bühler's Organon Model and designed the communication square. The communication square includes the factual layer, the relationship layer, self-revelation and an appeal. These four messages can be applied to both the sender and receiver in communication. Analyzing the four sides separately is helpful in cases of conflict or misunderstanding (Büttner & Quindel, 2013).

The factual side deals only with the real information of a message. This includes facts and the actual situation itself. On the self-revelation side, the sender reveals something about itself. The receiver then acquires information about the sender which has not been explicitly spoken. This can be information about personality, opinions or feelings. By accepting the communication with someone else, you automatically enter into a relationship with the conversation partner (Büttner & Quindel, 2013). The relationship side of this model attempts to explain how the communication participants stand with one another. A statement here may also give an indication of the type of the relationship. Often this particular side of the message is perceived by the receiver where the focus is elsewhere which leads to misunderstandings. Normally you want to achieve something with a message, and appeals, requests, or wishes can be expressed in this way. These prompts make up the appeal side. Here it is important to distinguish between an open appeal and a concealed one, which can restrain communication considerably (Büttner & Quindel, 2013).



The Sender-Receiver Model of mathematicians Shannon and Weaver is in principle a mathematical model, with the premise to investigate communication in a message-technical way (exchange of information). However it is a very common model to analyze communication. An interesting note is that this model is based on a reciprocity. According to the model, the sender sends a message through a channel to a receiver. The receiver now decodes the message and initiates the feedback process. It is important that the communicators have a similar coding in order to convert the signals into useful information (Ternes, 2008).

This model also includes ways in which the communication between the conversation partners can be disturbed. Disturbances mainly arise when the message or signal of the sender does not reach the receiver. This occurs when the encodings of the conversation partners are not exactly the same or the message is influenced by other external influences like noise (Ant, Nimmerfroh, & Reinhard, 2013). If this assumption is applied to the process of information transfer you realize that the communication does not necessarily have to be disturbed by noise or a bad connection, but rather by misunderstandings. Misunderstandings can include having a different theory, having another level of knowledge, disagreeing with or interpreting the message incorrectly.

Methodology

There are a variety of ways to improve communication, but this article is limited to literary possibilities which can be applied in practice purposefully. Here, purposefully means that the main focus is on the support or positive influence of learning performance and success. This article provides not only effective ways to prevent, analyze, and understand bad communication, but also to solve problems that already occurred. Several approaches will be presented in a broad matrix of solutions and analysis tools that can be applied to different situations.

Results

Before the results of this article will be discussed in detail, the concepts of learning performance and learning success will be explained so the results can be linked with these aspects.

The author Grezesik (2002) describes learning performance as a result of learning activities and self-development. Thus, learning performance is an activity. Grezisek does not, however, determine whether this performance is a partial, average or even final result of the learning activity. Furthermore it is required that previous results of learning exist, especially in the areas of acquisition, retention and reactivation. It is only possible to determine whether the learning performance increased demonstrably by comparison with previous learning activities. According to the author Eckert (2009), learning performance is defined by a combination of the learning ability, the learning will and the value of new knowledge. If the existing knowledge correlates with the new knowledge, positive effects on learning performance are possible.

According to Tödt (2008), learning success is defined by physical, emotional, motivational, situational and cognitive aspects. How strong the influence of the different aspects is cannot be determined exactly. For this reason it is important to involve the learner in the process to be able to assess learning success. In addition, the learner should be able to reflect each behavioral observation on its own. Sindler (2006) also adds that learning success



is a result of didactic activities and the stimulation of cognitive and emotional learning processes.

How the analyzed communication models and techniques are related is illustrated in Figure 1. On the basis of the research, there are models that describe the entire communication. The previously described models of Schulz von Thun and Shannon / Weaver can be seen on the outer edge of Figure 1. Moreover there are communication techniques which influence the communication directly, e.g. questioning- and listening-techniques. These are in the inner area of the figure.



Figure 1: Communication tools matrix

If the definitions of the concepts of learning performance and learning success are linked to the examined communication tools, the following picture emerges. Grezesik defines the learning performance as a result of an activity. Assuming that the use of the question and/or listening techniques in an information exchange process confirms interest in the conversation and is also an active action, the use of tools to improve communication have a positive impact on the learning performance. Paraphrasing - the reproduction in one's own words (Simon, 2004) - shows that information has been acquired, retained and merged. Also with the definition of Eckert that the combination of ability, will and worth and the correlation with already existing knowledge influences learning performance positively, parallels can be represented. If you have the ability to use tools for improving communication, you signal the will of new information and the information must have a correspondingly high worth. For example, by weighing up, different theses are compared and weighed (Simon, 2004). The ability to relate existing knowledge to new information can be identified. But even with control questions you clarify facts and thus connect the old knowledge to new knowledge. Not only the definitions of the learning performance lead to conclusions on positive effect of communication tools, but also the addressee analysis reaffirms the opinions of the authors Tödt and Eckert. According to Tödt, learning success depends on two pillars. On the one hand it depends on physical, emotional, motivational, situational and cognitive aspects, while on the other it depends on a strong focus on the learner (Tödt, 2008). Based on an addressee analysis, it is possible to enter certain aspects and place the knowledge taker in the center of this process. Eckert adds that learning success depends on didactic measures and the stimulation of the cognitive and emotional learning processes (Eckert, 2009). According to this definition, the knowledge provider is asked to initiate the process. With the help of an analysis of the conversation partner, it is possible to tailor didactic measures much more precisely to the needs and thereby stimulate the learning processes.

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Conclusion

Having presented possibilities to improve communication and how the concepts of learning performance and success are linked, the core elements of this paper will now be summarized. The fact that communication tools contribute to improvement has been confirmed already (Lorenz & Rohrschneider, 2010). A careful selection of the information can also support the recording of new knowledge (Büttner & Quindel, 2013). The question which has been discussed here is whether the improvement of communication also positively influences learning performance and learning success. Obviously the communication tools meet the definitions of learning performance and learning success can be supported by communication tools without hindrance. Of course, the models of Schulz von Thun (Rothe, 2007) and Shannon / Weaver (Ant, Nimmerfroh, & Reinhard, 2013) are subject to certain criticisms, but this work shows that communication tools provide solutions for communication problems and also that learning performance and learning success can be positively influenced.

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The Importance of Education Faculties in Applying Services to Society. Example: An Application

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Abstract

The most important components of universal community values are social solidarity and helping each other. In forming such values, the periods of pre-school, first school and secondary school education in which one-to-one training takes place most are of vital importance. During these training periods, the teachers took on a vital mission. The values such as acquiring a sense of social responsibility, self-efficacy and working in co-operation and solidarity which are the most obligatory qualifications among the targets of the teachers put forward. In this sense, the teacher candidates are expected to be a role-model and an equipped-guide. A teacher candidate equipped with such qualifications will be an opportunity for the students. During training the period, the applications which aim at developing these kinds of abilities of the teachers are of vital importance. The teacher candidates who are both planners and applicants of a socially-benefitted project are also expected to improve their own social skills. In the study, "Astronomy Festival" which is directly related with the future professional jobs of the science teacher candidates was decided to be performed. The Astronomy Festival aims at both gaining self-efficacy and creating awareness with the secondary school students. The aim of the study is to perform an application in the scope of services to society and search the impact intending to measure the level of social skills of the teacher candidates.

Keywords: Socially-benefitted project, science teacher candidates, social skills, education faculties.

Main Conference Topic: Science Education.

Introduction

The most important components of universal community values are social solidarity and helping each other. It is of vital importance to improve contributions aiming at providing social services to the community in respect of social unification at every age and educational stage. Social life in which the induvial exist affect the improvement of their sociocultural and socioscientific advancement directly. That an individual is a part of an activity based on social cooperation is expected to contribute his/her social skills and self-efficiency beliefs to improve in positive way (Özyürek & Ceylan, 2014). In such a case, education faculties are of vital responsibility. The values such as acquiring social responsibility and self-efficacy and working in cooperation and solidarity come into prominence. The knowledge, skills and beliefs acquired by teacher candidates in this scope will be able to be reflected into their professional lives and their own students indirectly. And the teachers are expected to gain basic knowledge, skills and behaviors at pre-school, first school and secondary school stage (Yılar & Şimşek, 2016). The period during which hectic interaction exists with the students is required to improve the individual and social skills as well as academic abilities. (Akkök, 2006; Avcioğlu, 2012). At this point the important action is to provide environments in which



the students can interact with each other. Creating such kinds of environments by socially advanced skills teachers will be an opportunity for the students.

The project aims to bring the teacher candidates having the lesson, "Applications of services to society" the consciousness of responsibility in institutional and applicable manner. During the application the teacher candidates are targeted to improve the skills of cooperation, solidarity and effective communication. The planned astronomy festival will be held to acquire the skills; creating an awareness of astronomy with secondary school students and gaining self-efficacy and socially-thinking with the teacher candidates having the lesson of application services to society. The aim of the study is to carry out an application in the scope of social services and search its impact level on social skills of the teachers.

Taking into consideration of all these objectives and requirements, in this study, an astronomy festival was organized with the participation of science teacher candidates and secondary school students in Ordu province. In the scope of the festival portable planetarium, 3D cinema display, experiments and activities were organized and all the schools in Ordu were invited.

Method

The samples of the study constitute the teacher candidates training in the 3rd class at Education Faculty of Ordu University (N= 30). "The social Skills Scale" with Cronbach of the stable coefficient 0,94 has been used to gain the data displaying social skills of the teacher candidates. In the previous and the latter stage of the study, the scale has been applied in the one-group form of pre-test and final test.

The Application Services to the Society

In the scope of the lesson "The Application Services to Society", the teacher candidates organized meetings to make plans for the astronomy festival for 2 months and shared their duties. At the planning stage, setting up a portable planetarium, travelling to the space and planets through virtual glasses, observing the sun through telescope and displaying the cluster of stars, making the sky map, experiencing water-rocket were decided to carry out. In addition, one of the teacher candidates was planned to wear in an astronaut dress.



Figure 1: Water rocket experiment.



The event lasted for two days and the students in Ordu province were invited through appointment and 1500 participants took part in the event. The participants took a great interest to the astronaut-dressed teacher candidates. Besides, a professional astronomer informed the participants and made presentation about the event outdoor. Also, the application of water-rocket experiment was performed by the students.



Figure 2: Star cartography narration and construction.

In the area of the event, a variety of stands were located and the teacher candidates were on duty of the event. The participant students were informed about the event and taken in the applications.



Figure 3: Journey to the depths of space with virtual reality glasses.

The virtual reality stand with virtual glasses was the most attractive of all stands. In the stand, an environment was provided for the students to live and feel as if they were in space.

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Figure 4: Portable planetarium.

The portable planetarium has been the most attractive space of the event. A group of 20 students was accepted in a $6m^2$ planetarium to present the application. After a short informative presentation to the participants, a film of the space and the planets was displayed by reflecting up to the ceiling for 15 minutes. The participants watched the display lying on the pillows.

Results

Pre-test and final tests belonging to "social skills scale" have been applied to the science teacher candidates performing social service application. The analysis of the data has been analyzed using "the one-group t test". The results of the findings of the analysis are as follows;

	Ν	Averages	Standard Deviation	t-test results	Significance
Pre Test	30	227,47	23,829	2 9 2 7	001
Post Test	30	250,33	25,671	-3,827	,001

Table 6: Social skills scale pre-test, post-test results.

From analyzing of the data social skills of the teacher candidates are seen to create a meaningful difference in positive way (p < 0.05).

Conclusion and Discussion

Honoring of the individuals having a socially advanced skill in society is high. The individuals having a high self-efficiency impact their communication skills in positive way as well. These kinds of people are capable of improving self-confidence, participation with the peer groups and being active in cooperation events. (Gülay & Akman 2009). Forming healthy social relations will also provide the socially skilled individuals to be successful and happy. (Ceylan, 2009; Leung, 2010; Gülay & Akman, 2009; Kargı, 2011; Özabacı, 2006; Özyürek & Ceylan, 2014). The insufficiency of such skills will be quite difficult to gain in the



next years. In this sense, having these kinds of equipment during first and secondary school period for the students is of vital importance.

In our study, the science teacher candidates who have exhibited the best examples of social solidarity and helping each other which are the most important components of universal society values have successfully planned "The astronomy festival" prepared in the scope of "Society Service Project lesson" and directed and implemented in kindergartens, secondary schools and with university students in Ordu province. The teacher candidates who are the most important elements of the event based on social co-operation will be an important model for the students in their future professional lives. From the results of the study, we understand that the teacher candidates have improved their social skills meaningfully in a positive way. The social skills of the teacher candidates; the active participants of the study prepared on the base of social co-operation have positively developed and the application of such events based on training of the teacher candidates are advised to improve their social skills as well.

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Brief biographies of the author

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Designing a digital textbook for the classroom in the Mobile age

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Abstract

Digital textbooks which may be enhanced with interactive features have been used and developed worldwide. They come in many different forms such as read-on-demand computer-based textbooks, print-on-demand e-textbook, and curriculum-based electronic textbooks. This article is to explore the dimension and shape for the future of digital textbooks. We suggest some design strategies to develop digital textbooks for instructor-led classroom. The strategies are based on the principles of learning introduced by Thorndike. And then, we present some prototype learning objects available in digital textbooks.

Keywords: digital textbook, functionalities of digital textbook, instructor-led classroom, learning activities, learning effectiveness

Main Conference Topic: Research on Technology in Education, E-learning

Introduction

In higher education, the textbook is the greatest tool of the classroom experience and the ways in which teachers and students interact with the information contained in textbooks is a key definer of the learning experience. Textbooks help to standardize the material teachers present in content areas; ensure that classroom content is aligned to mandated curricula; provide a focal point for instructional activities; support pedagogical approaches; and give structure to homework (Mardis et al., 2010; Rockinson-Szapkiw et al., 2013). As information technology offers opportunities for new ways of creating teaching and learning resources in the last few decades, instructional materials and activities have become digitally rich and the use of digital textbooks is rapidly gaining ground in education at all levels (Choi et. al., 2011).

There are three types in which digital textbooks exist as follows: The first type may be defined as the simply scanned pictures of the print version of the book. An example of this is a PDF file with no dynamic media, no active web links, and no capability to manipulate font or pictures. Secondly, the digital textbook may be considered as a digital book with some kind of additional functionality like interactivity, term searching, and links to more information and related web sites. The last type may be a digital offering from a publisher that may not resemble a book at all (Rockinson-Szapkiw et al., 2013; Arenas and Barr, 2013).

The main focus of the current development of digital textbooks is to completely transfer the contents of all printed textbooks to computer-based books by integrating several learning materials with the benefits of multimedia features. This effort is worthwhile to give birth to new forms of future education materials (Park et al., 2012). However, the question is what educational effect we can expect from the type of digital textbook. More specifically how should digital textbooks evolve as they get used in educational institutions? This paper has been designed to answer this question. We believe that digital textbooks should focus on the



implementation of various instructional methods to provide more diverse learning activities and improve student learning achievement with greater efficiency and effectiveness. In this article, we design a digital textbook for the classroom based on the principles of learning introduced by Thorndike (1914). We firstly suggest some design strategies to develop digital textbooks, and present the prototype learning objects of the digital textbook.

Design principles

The main functions of digital textbooks include the basic features of printed text-books and the supplementary features of information technology and digital media. These additional features can include display functions, input functions, moving to a particular page, and search functions, in addition to the multimedia features and learning support functions such as hyperlinks, interactions, file transmissions, assessments, creating learning content (Byun et al., 2006; Kim et al., 2010). Arenas and Barr (2013) listed some new functionalities that digital textbooks should have. The model of digital textbooks is defined by the learning needs and demands of the future students and the teachers and institutions that help them learn. In this section, we suggest some design strategies to develop new generation digital textbooks.

- Questions and responses: Questions and responses are the most fundamental and important activities in education, and a great way to grasp the understanding level of each student on specific learning contents. Digital textbooks, therefore, should have the facility to support them, in particular instructor's questions and students' reaction, in themselves, and to collect and manage the data relative to questions and answers on further steps.
- Monitoring students based on learning data: To grasp students' understanding and to provide feedback, instructors should monitor student learning activity data. Learning data is a highly meaningful resource to observe document learning behaviors. A lot of research has shown that using data for instructional decisions can lead to improved student performance (Wang et al., 2011; Wayman, 2005; Wohlstetter et al., 2008).
- Assessment: Another factor of digital textbooks is the facility to support assessment. There are many alternatives to traditional assessment types that can be used to broaden the scope of the teacher's classroom assessment activities (Bouchillon et al., 1999). The typical techniques of the alternatives are self, portfolio, and peer assessment. The next generation digital textbooks should support to alternatives as well as traditional types of assessment.
- Experimental learning and learning by doing: Involving students with in-class activities is a pedagogical method intended to promote active learning. Digital text-books should support to create various activity-based objects for experimental learning or learning by doing. This is the facility that paperback books can never provide. Digital books should incorporate a variety of learning activities and cloud-based resources such as immersive simulation environments for practice, collaborative/individual homework, and adaptive testing and assessments.
- Including some functionalities of learning management system (LMS) and course management system (CrMS): The next generation digital textbooks will not be restricted to duplication of the printed page on a digital device, and be able to pro-vide more types of learning contents and digital tools. To do that, they should include many functionalities of LMS and CrMS.

Exemplifications of learning objects for digital textbooks

Educational psychologists and pedagogues have established some principles of learning, also referred to as laws of learning. These principles provide additional insight into

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what makes people learn most effectively. This section presents some learning objects designed for teaching in the classroom based on the learning laws.

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Figure 1: Question and response



Figure 2: Learning data

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Figure 3: Activity-based object for learning by doing



Firstly digital textbooks should include student/classroom response systems such as clicker system (Bruff, 2007). It'd be more efficient that the systems are run integrally with other learning objects. Figure 1 presents an example of questions and responses including a digital textbook developed in this study. Instructors can generate questions where they want. The responses of students are immediately collected, provided to instructor as well as students, and used for further data analysis. Figure 2 shows an example representing learning status of students based on learning data in a digital textbook. With the learning data, we could grasp the understanding level of each student on specific learning contents, and provide appropriate feedback in real time. Figure 3 shows an example of activity-based object for experimental learning and/or learning by doing. Activity-based object can lead to improved degree of concentration and satisfying feeling.

Discussion and conclusion

A key element of the revolution in education is the emphasis on interactive, exploratory, and collaborative learning activities. Digital textbooks can support richer learning content with a combination of various learning materials, including not only textbooks, reference books, workbooks, dictionaries, and hyperlinks, but also multimedia content, such as audio, 3D graphics, animations, video, and virtual and augmented reality.

In this article, we explored the design principles of digital textbooks for the class-room based on the laws of learning, and presented some prototype learning objects available in digital textbooks. As mentioned in Arenas and Barr (2013), there are many forces re-shaping higher education, and whatever future faculties teach it is likely that much of that teaching will be done differently. We expect digital textbooks will evolve in completely different from now to help teachers teach and students learn.

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From educator to companion - self-determination and participation of children as a cause for the change of roles of pre-school teachers

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Abstract

Extending from the increasing social demands on the pedagogical work of preschool educators and the public perception of childcare as part of the educational system, the current understanding of the roles of educators is questioned. Neuroscientific findings, which examined the learning process of children, led to a stronger self-determination right and greater participation in everyday pedagogy. The question that arises from this is, what role-educators in the educational process of self-determined children. It turns out that a change of roles took place, from apprentices to an accompanying role. Children need free space to determine their actions independently. The educator continues to provide adequate educational opportunities, but these are now based on an observation of the children's stimuli.

It is clear from the qualitative, empirical study analyzed here that educators are assigned different roles. Educators in today's educational understanding, are bonding person, educator, adult educator and observer. It thus becomes clear that the integration of the child's needs into the design of the education process has led to a strong interweaving of the requirements for early pedagogues.

Keywords: self-determination, early-childhood-pedagogy, quality-management, quality-development, children-day-care-centres,

Main Conference Topic: Educational Management

The Aim of the Study: The aim of this study is the methodical presentation of the selfdetermination processes of children and their impact on the role understanding of educators. The goal is to find out whether and how pedagogical work influenced by an increasing childoriented view.

Materials and Methods. This article uses the theoretical foundations of science with the focus on quality assessment in early education. Considering a current topic, this empirical qualitative study. Experienced experts interviewed and questioned on current issues. The experts are predominantly from the area of early education and have themselves enjoyed a pedagogic education or are active in this sector.

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Introduction

Since the integration of day-care centers into the educational system and the associated recognition as an educational institution, as well as schools, children's day-care facilities are under considerable pressure of change. The system is being observed more closely, especially under social and political aspects. Children's day-care facilities are subject to the change from childcare to education facilities (Cp. Hübner, 2016, p. 88 f.). On the basis of this principle, educational processes of children play an essential role for the pedagogical work of educators.

The profession of the educator has changed considerably in the past decade. Particularly the early childhood education, the kind of the care as well as the education have experienced a strong change. Social changes, scientific findings, as well as the international experiences triggered by globalization lead to an increase in the demands on the professional field of educators. The image of the profession becomes more complex and demanding by these drivers. The changes are mainly related to three areas: social changes, new scientific findings and new political developments (Sylva, Siraj-Blatchford, & Taggart, 2010).

In principle, the social changes relate to the family structures that are emerging, as a result of changed family views, in which, for example, fathers also assume the role of education, and thus classic distribution of roles is broken. Furthermore, the improved possibilities for the reconciliation of family and career of extended and flexible childcare offers with a more comprehensive education and training offer (Cp. Kasüschke, 2008, p. 1 f.). The increasingly flexible and individual offers require closer cooperation with the parents. Despite the growing heterogeneity in the day-care centers, through integration children or children from socially disadvantaged families, this claim has to be implemented. Children with a different background of migration lead to an increased concentration on language promotion, education and the promotion of integration.

Theoretical framework

In the following section, the self-determination and the participation of children will be discussed. For this purpose, theoretical research results from brain research, developmental psychology and applied pedagogy are used. In the further course, these basics are used as the basis for the changed role understanding of preschool pedagogues.

Self-determination and participation of children

Starting out from current brain research and developmental psychology, children in the elementary and nursery school are discovering themselves. Joy and curiosity are the main drivers that lead to the perception of the environment. Children independently collect experiences and draw conclusions from them (Cp. Textor, 2014). This self-experience of the environment leads to a self-learned increase in knowledge, both with regard to the development of competencies as well as with regard to physical and psychological development. It turns out that children have the ability to set up and review their own hypotheses about everyday events (Cp. Andres & Laewen, 2011). The ability of one's own



generation of hypotheses and of the examination in the narrower sense characterizes the concept of the self-education of children. Children learn to integrate socially, culturally and materially in their own world. In a development-psychological context, Ahnert defines the self-development processes as follows: "By developing a picture of the world, the child also develops a picture of one's own person and develops his social identity in this self-formation process" (Ahnert, 2013, p.

It is from these approaches that the primary goal of development research is that children open up the world through self-employment and self-activity. This means that children develop into independent personalities and set the values for an essential character formation. The pedagogical orientation of child day care centers is closely linked to the self-determination of children. The self-education is achieved mainly by providing various experiences by the pre-school teacher. A prerequisite in this context is that the children are free to decide on appropriate offers. So choose them according to your experience and interest. Starting from this change in perspective, away from the pre-school teacher to the child, the basic question is the role of pre-school teacher in the educational process of children today. Children need a social counterpart to develop social skills. It is thus possible for them to gain recognition and support (Cp. Senckel, 2016).

Overall, the involvement of children by participating in the education process is an interdisciplinary challenge. A challenge for the educators, but also a challenge for the children. Participation processes always require the setting of new boundaries and the negotiation of different interests. As a principle for the participation of children, education can not be provided (Regner & Schubert-Suffrian, 2015). Rather, education takes place through self-education. Self-education is embedded in one's own world of interests and life. The best possible educational opportunities arise when they are perceived in the education process.

Situational approach

A theoretical example for the orientation of the pedagogical work on the selfdetermination and participation of children is the situation approach. This requires the teachers to derive appropriate steps of action from observations, in order to work out proposals that are of interest to the children (Cp. Heller et al., 2009). To this end, the situation assumption assumes that the life situation of children plays a key role in the corresponding interests. The sense of community plays a decisive role in this context (Preissing et al., 2003). Decisions are made in a social context. This means that decisions always have an impact on the community. In the narrower sense, the community of the institution is considered as a community, but also the families of the children, the school or cultures come from the group members (Brandes, 2008). The three overarching objectives of the situational approach are autonomy, solidarity and competence (Heller et al., 2009).

In the following, the autonomy in the situation approach will be described in more detail in order to draw conclusions about the role understanding of educators. In the room situation, autonomy is understood as independence and self-determination (Cp. Zimmer, Preissing, Thiel, Heck, & Krappmann, 1997). By involving all group members in decisions, the ability to self-determination and participation is strengthened. Participation thus represents an important partial aspect of autonomy. The self-determination of children is reflected not only in the participation in projects, but also in the further course of the day. Within the group, boundaries, rules and ethical values are developed. Nevertheless, the

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autonomy and self-determination of children is not equated with the condition of freedom of regulation and desire satisfaction in the situation approach. The task of educators is also to set boundaries. These are mainly due to the respect for the rights of others in the Community, as well as to ecological values (Cp. Heller et al., 2009).

Change of roles of pre-school teachers

The self-determination and participation of children places high demands on the role understanding of educators in pedagogy. The prerequisite of every pedagogic action is the observation. This includes both the observation of the individual children as well as the observation of the whole group. This requires the ability to withhold. Educators must be able to put their own interests behind the children's interests. Nevertheless, provide sufficient security to enable education processes.

In present science, the educator is assigned various roles in the educational process. The educator is a bonding person. Binding is already in the early childhood and is the basis for a successful long-term care (Rossbach, Kluczniok, & Kuger, 2008). Children need security and security to feel comfortable in a strange environment.

Another and probably the core task of every educator is the pedagogical role. The understanding of teachers and learners. In this context, the teacher is understood as a teacher and a learner. This role is fulfilled when specialists evaluate their work to the best of their ability to accompany and support children in their development. According to Mienert and Vorholz, the first pedagogue always represents the child himself, the second educator is the other children, followed by the pedagogue himself, and finally the space and the immediate environment of the child (Mienert & Pitcher, 2011). Out of this basis for the best possible learning development, numerous possibilities for action can be derived. In this new understanding of the role of the educator, it is in the narrower sense of the educator as a person and the cooperation with the children, parents and the public. The new role understanding of educators also leads to children being able to recognize a role model and act as self-reflective. So they should not only take advantage of offers, but equally weigh what is appropriate and useful for their living situation.

Model for the change of roles of pre-school teachers

On the basis of the theoretical foundations and on the basis of the empirical findings and observations, a model was developed which illustrates the future understanding of the role of educators. The basis for this model is the realization, the increasing participation, as well as the consideration of the individual personalities of children. Self-determination is the cause of all pedagogical action and the need for careful observation. Multidisciplinary Academic Conference



Figure 1: Role-model of pre-school teachers in an early childhood setting

The model illustrated in Fig. 1 begins with the observing role of the educator. The role as an observer is of central importance. The function of observation is also an integral part of current educational plans (Preissing, 2014). The aim of the observation is to change the pedagogical orientation. Offers and learning incentives are based not on the interests and skills of the educator but on the life situation of the children. It is therefore possible for educators to get to know children in a more comprehensive way. The aim is to develop an understanding of needs and desires. The child in his being is characterized by external influences that are named in this model as social, cultural and material influences. It is thus clear that external influences have an influence on the development process, especially in the area of early education. The sum of the child's external influences and actions sketches the child's interests and stimuli. From the effects of the child, the educators, according to this model, provide incentives for their pedagogical actions. At this point, the ability to link is necessary. Only from this point, educational offers are provided. As participation, these can be influenced mainly by the children. In this context, offers are not regarded as compulsory. Rather, they satisfy the needs of the children and promote their competence for selfeducation. Offers must offer free spaces and the possibility to choose.

Conclusion

This model illustrates the change in the role of pedagogical specialists in early childhood education. It illustrates the change from biological development understanding to the environment-oriented, behavioral development understanding. The pedagogical orientation is now orientated towards behavior and takes into account the life situation of the children. Self-determination and participation essentially determine the relationship between teachers and learners. The teacher takes not only the role of the teacher, but also the role of the learner. Stimuli and interests of the children influence the image of the child and the role of the educator.

An educator's current understanding of the roles is based on the assumption that not one role but different roles are assigned to the educator. The educator is a bonding person, educator, adult educator and observer.

The role as a person of attachment does not often find in the public perception the importance which must be assigned to it in principle. For the establishment as a bonding person, the integration of the children into an environment unfamiliar to the children is of



fundamental importance. A good familiarization enables the children to get to know the educator as a trusted person who gives them protection and safety. It is precisely this protection and security which they usually find in the family environment. Without bonding, children are not able to build trust and to initiate the learning processes that are important to them. The role as a binding person can not be enforced. Binding is formed over time. Children attach a close bond to such educators, who do not negatively criticize them if they seek proximity, treat them with degradation, but show sympathy and cultivate a warm heart.

The role of the educator as an educator can be understood as the central task in early childhood education. A good pedagogical specialist is in a position to check his / her own work performance and to reflect whether the pedagogical activity creates an environment for the child in which it has the best possible learning and development conditions. This means that the knowledge about early childhood development and the experience gained from the observation of the children leads to deductions for the pedagogic activity in everyday life. The pedagogical roles are essentially four basic understandings:

- The first pedagogue is the child himself. This basic understanding illustrates the self-determination and co-right of children. Children should be drawn to self-determined and socially compatible personalities. This principle is intended to strengthen the ability to self-reflection and personal perception so that interests can be recognized and communicated on the other.
- The second educator is the immediate social environment. This allows the child the option to compare and deal with other topics. The goal is the enrichment of the world image and the strengthening of the social competences, in that learning processes are designed in accordance with individuals with similar sociodemographic characteristics.
- The third pedagogue of the child is the educator. This pedagogical role has in the past been assigned the essential and usually only role in the development process of the child. The educator as an educator is able to orient his actions in a child-oriented manner and, according to FIG. 1, to offer educational offers on the basis of the stimuli emanating from the children.
- The fourth pedagogue is assigned to the space in the current scientific understanding. The space, that is, the external conditions, contributes to the positive development of the child, if this stimulates discoveries and offers the opportunity to explore one's own actions.

The role of the educator as an adult educator originated primarily from the growing interest of the parents in the educational events of children's day-care centers. Just like the parents' increased demands on their children. The aim of the cooperation with the parents is not to educate the parents, but together with the parents to shape the educational process of the children. This also implements the setting of a learning goal. As already described in the previous section, this is mainly due to the situational approach, which sees the life situation of children as the basis of all educational activities.

The role of the educator as an observer. The role as an observer arose through the perception of the children as actively learning personalities. In particular, the observation requires, in the practical work of an in-depth documentation, the subsequent comprehensibility of the relevant offers. This understanding of the role opens up a new way of looking at the children. Habitats and behavioral problems are thus perceived in more detail. Observing means restraint. Actions must be understood without direct intervention. Children should be able to shape their own actions.

On the whole, the educator as a pedagogue places various demands on his work. In essence, however, the integration of children into pedagogical action leads to a change in the

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role understanding of educators. Educators take less of the role of a teacher, but rather the role of a companion. The learning processes of the children are thus not defined, but actively shaped by the child.

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Brief biography of the author

Alexander Huebner (M.A. Business Economics)

Alexander Huebner studied at the University of Applied Management Construction and Real Estate Management on Bachelor of Arts and HR and Health Care Management at Master of Arts. Since 2016 Alexander Huebner has been a Ph.D. student at the Riga Teacher Training and Educational Management Academy in Riga, Latvia. His dissertation includes the topic of the quality development of the educational work of pre-school teachers in Germany. He has been working for a provider of childcare centers in Berlin since the beginning of his studies, which management he assumed in 2016.

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Yasemin Altiman studied at the University of Applied Sciences Healthcare Management on Bachelor of Science. After that she studied Business Administration on Master of Arts at the University of Applied Management with focus on Healthcare Management and Human Resources. Since 2015 Yasemin Altiman has been a Ph.D. student at Riga Teacher Training and Educational Management Academy in Latvia. Her dissertation includes the topic of healthy lifestyle to improve the work performance of adults. Since 2015 she is working for an international healthcare company in Germany. Here she's responsible for projects in Human Resources and Healthcare Management.

The journey to developing students' self-confidence in an action research project: Bilgedefter.com

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Abstract

At the age of 11 as a pupil, Jean Piaget wrote a single page article based on his observations of an albino sparrow. He later submitted his article to a journal for amateur naturalists and it was published! If the article hadn't been published, would Piaget still have the same scientific career in the future? No one can say for sure. However, everybody may partly agree that it was a starting point and a touch for his becoming a genius. This story pave the way for questioning how we can create opportunities for the other potential 'Piagets' who need a chance for a turning point and a touch to becoming geniuses.

Accordingly, the purpose of this paper is to introduce our journey so far to developing primary school students' self-confidence, which started in 2015 and still continues as a self-funded action research project by the collaborative efforts of the academicians, school teachers and university students in Konya, Turkey. Therefore, we will give information about our website called "bilgedefter.com" as the product of our ideas, its aims and scope, the dissemination activities done, the content of the student articles/writings published and the feedback from the students and their parents.

Key words: Action research, self-confidence, student articles, student writings, bilgedefter.com

Conference Topic: Academic Research Projects



Virtual Reality and Autism

Ange Anderson

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Abstract

Children with autism can have phobias and fears about real life situations. It is important for parents and teachers to know how to prepare pupils with autism for those situations. The purpose of this paper is to assess the value of virtual reality in preparing pupils with autism for real life situations that they fear the most. This paper will share findings that illustrate the impact of virtual reality on pupils' ability to cope when in a fight or flight situation leading to real-life functional improvements for activities that were previously not possible.

Keywords: 1, autism2, virtual reality 3, technology 4 interactive

Main Conference Topic: E-Learning, Virtual Learning Environments

Introduction

We are living in exponential times. In the near future children will be using technologies that haven't even been invented yet. Children with autism have been shown to display high levels of comfort with technology for many reasons. Computer programmes are predictable, logical, and can provide an intellectual outlet for children with specialised interests. Those of us who work with children who have autism know how much they like computers, iPads and other kinds of technology.

What they do find difficult is actual real-life situations. How often has a parent of a young child with autism stood by helplessly as their child has a meltdown in a supermarket, at a road crossing, on a train?

How can we use technology to make real life situations easier for children with autism?

Parents and teachers have watched children with autism play back a scene in a movie over and over again to help them make sense of a confusing world. What if we use that knowledge to recreate virtual reality situations - the local supermarket, the local road crossing, the local train station for instance? What if we have a room that children with autism can enter, press a switch and the room becomes an interactive version of the local crossing.



If the pupil is safe and secure with a trusted teaching assistant the pupil can play back that scene/scenes as many times as they wish until they feel comfortable enough to visit its real counterpart.

"Children with autism rarely have opportunities to experience or to learn to cope with dayto-day situations. Using virtual simulations enables them to acquire skills that will make it possible for them to become independent," said Josman and Weiss (2008).

We are on the cusp of a serious and arguably revolutionary step in technology provision that schools who have pupils with autism need to take seriously as a classroom resource. Devices range from simple PlayStation virtual reality to zSpace devices which include a compartment for a smartphone with a built-in lens compatible with the phone's virtual reality apps to create 3-D experience. It's motivating and engaging teenagers like never before. At the moment the majority of our pupils in our school are not comfortable with putting the headsets to these devises on.

Related work

In September 2016 a Therapeutic Virtual Reality room was set up in our school, Ysgol Pen Coch, in North Wales. It gives pupils a 360degree experience.

The setting up of this room has enabled us to be able to offer our pupils the chance to experience and play out difficult situations which they often meet during their daily life and routine. Handheld controllers and sensors, give a whole new feel to the artificial reality experience. We have transmitters and receivers on the walls and the immersive experience is very real. This is not simply an engagement tool or a gimmick, it allows a pupil to explore, to experience as if they are actually present in that environment or place.

The experiential situations they can experience were chosen as a result of communicating with parents about situations which caused them the greatest concern. For the first trial we used the template already refined by the university of Haifa.

Model

Researchers Prof. Naomi Josman and Prof. Tamar Weiss, from the university of Haifa in Israel, found that a month-long program of virtual reality training designed locally could help children with autism, aged between seven and 12, dramatically improve their ability to cross the road safely.

It is widely recognized that the best way to teach children with autism is through repeated practice in natural settings. The dangers involved in crossing a street, however, rule this method out. Virtual reality is a good alternative.

Six autistic children were involved in the study at Haifa university. The children spent a month practicing to cross virtual streets, wait for a virtual light at the crossroads to change, and to look left and right for virtual cars.

The children quickly mastered the different levels of the virtual reality system, including the ninth – most difficult level, where vehicles travel at high speed. They then applied their virtual skills to a local practice area where they were able to navigate a street, crosswalk and traffic signals.

In testing, the researchers found the children showed an improvement in their skills following the training on the virtual street. Three children were found to show considerable improvement.

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Implementation

Our pupils experienced difficulty when they are required to wait at the local pedestrian crossing for a period of time whilst out on an Educational visit in the Community and as a trial run our first Virtual experience that was set up was called " Crossing the Road "One of our teaching staff visited the local pedestrian crossing and took various photographs and made a video of all the sounds experienced there.

She then transferred these onto a programme on the computer which is connected to the Virtual Reality equipment which resulted in 3D version of the crossing and relevant sounds being projected onto three walls in the room.

Each pupil who it was felt would benefit from this extra interaction was offered an individual session of between 10 - 15 minutes in length once a week spanning over a period of 8 weeks in total and split up into 3 stages.

During this time each pupil was encouraged to act out "crossing the road". They were required to look for and listen to all the sights and sounds associated with what happens when you cross the road using the pedestrian crossing. They learnt how to press the button to activate the green and red man and they learnt to be patient and look and listen continually for the red and green man.

Once the children were confident with the first stage of the experience they moved onto the second stage in the virtual reality room. The setting up of actual pedestrian traffic lights which had a timer built into the workings. Using the timer the traffic light sequence was worked through and the pupil had to stand still at the crossing until the lights changed and the green man showed instructing them to cross the road.

At the 3rd stage pupils were taken to the actual crossing to see whether the extra input throughout these sessions had been successful or not in helping them cross the road in a safe manner. During a total of one week each pupil was taken to the "crossing" where the success or failure of the programme was observed.

Results

The results were that out of 30 pupils who took part in this therapy all 30 of them were able to arrive at the Crossing, press the button to activate the red and green man, and wait patiently until it was time to cross- without becoming agitated or stressed. Each child was able to cross the road with confidence. Each individual session was written up and recorded along with photographs taken of each child experiencing the real crossing.

. Further results

The virtual reality room has since been used for an individual pupil whose parents had to do a two- mile detour every day to bring him to school so that they didn't have to go through traffic lights. He was very agitated in the car and screamed if they came upon a traffic light during a car ride. The situation was re-created in the virtual reality room and the pupil was able to operate the traffic lights for himself. After two weeks of daily visits to the room the parents were able to report that they no longer have to avoid traffic lights. Their child no longer has an issue with traffic lights and is perfectly content in the car. An added bonus is that they can leave home at a reasonable time. Currently the virtual reality room has become the school and site of the secondary school that our year 6 pupils will be transferring to in September. Some of our pupils were not able to take part in the transition projects planned due to the high anxiety levels they encountered when they attempted to take part in the projects. Thanks to the technology we now have we were able to create a safe in-house transition project



using repeated practice in getting those pupils used to the secondary school and its grounds in preparation for their actual transition at the end of the summer term.

Conclusion

The use of virtual reality to create a controlled and safe environment that is closely representative of real life has proven beneficial to pupils in our care. We all learn by seeing and watching. Pupils with autism are now able to build their own private secure library of how to cope with social situations ordinary people take for granted.

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Author 1

Ange Anderson is a head teacher/principal of a special school in North Wales.75% of the pupils have autism as a primary or secondary diagnosis.

She has a Master's degree in learning difficulties with particular interest in the education of those with Profound and Multiple learning difficulties and also those with autism. She gives talks in relation to these learning difficulties. She has written articles for prestigious journals and has a strong public speaking record raising awareness of the incredible benefits of innovative practices in schools.

She has edited a book (of which she has written some chapters) about the future of special schools. She has also had articles also writes children's books in her leisure time under the pen name of Angela Morgan.


INSTRUCTIONAL STRATEGIES FOR ADULT LITERACY EDUCATION

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Abstract

Postsecondary institutions are finding more students without the literacy proficiency to study on the collegiate level, yet little research has been completed in the area of adult literacy instruction. Due to this deficiency, literacy instructors have relied on utilizing children's reading strategies which have proven ineffective in an adult setting. Research shows that adult learners are self-directed, need to engage in relevant curriculum, and must recognize their current literacy practices before remediation can take place. This study looked at the effects of implementing three research-based strategies into an adult basic literacy course: reflective essays, individualized goal-setting conferences, and self-selected reading projects. Results indicated these strategies were effective in increasing low-literacy adults' success in an adult basic literacy course.

Keywords: Higher Education, Barriers to Learning, Effective Teaching Pedagogies, Learning Styles

Main Conference Topic: Education, Teaching and E-learning

Introduction

Individualized goal-setting conferences, self-selected reading projects, and reflective essays may be effective in teaching reading to adults with low literacy skills. While one in four adults is functionally illiterate in the U.S. (America, 2003), and postsecondary institutions are finding more students without the literacy proficiency to study on the collegiate level (Fiddler, Marjenau, & Taylor, 2000), little research has been completed in the area of adult literacy instruction (Miller, McCarlde, & Hernandez, 2010). Of these lowliteracy adults, 79% are between the ages of 16 and 64 years old (Mellard, Fall, & Woods, 2010), signifying a large literacy deficit currently existing in the U.S. workforce. Due to this deficit, literacy instructors have implemented children's reading strategies into adult reading programs with little success of increasing adult comprehension (Jimenez & Venegas, 2004). What has been determined is that adult learners are unique in that they are self-directed and need to relate new material to real life (Blaylock, Wiggs, & Lachowicz, 2008). Without this relevance of material, reading instruction has little success with this population. Along these same lines, Knowles' theory (1973) indicates that adults respond to the concept of andragogy, an adult teaching theory that purports adults learn differently from children or adolescents and prefer to engage in practical and relevant curriculum. Taylor (2006) included the idea that low-literacy adults need to first recognize their current literacy practices before remediation can take place.

This project tested the use of individualized goal-setting conferences, self-selected reading projects, and reflective essays in an adult basic education literacy course as possible strategies that could increase literacy performance and comprehension in low-literacy adults. All three strategies required input from the adult learners; hence, they should have proven effective and relevant in engaging low-literacy adults' successful literacy practices while



relating material to real life. The aim of the study was to show success through both the passing of the basic literacy education course and students' intentions of registering for further postsecondary education courses. And the final aim of this project was to identify and implement reliable, effective instructional strategies for adult learners who lack literacy proficiency with the goal of their gaining comprehension skills and continuing their postsecondary education.

This project examined the following questions: 1) To what extent are individualized goal-setting conferences and self-selected reading projects effective strategies for teaching low-literacy adults? 2) What is the effect of individualized goal-setting conferences and self-selected reading projects on low-literacy adults' successful completion of an adult basic literacy course? 3) What is the effect of individualized goal-setting conferences and self-selected reading projects on low-literacy adults' reading skills and achievement? 4) What is the effect of individualized goal-setting projects on low-literacy adults' reading skills and achievement? 4) What is the effect of individualized goal-setting projects on low-literacy adults' planning and anticipation of participation in additional postsecondary courses?

Related work – Historical Perspective

While higher education in America began with European concepts during the colonial era, The Morrill Acts created land-grant colleges in response to the agricultural and industrial needs of the developing society. By the early 1900s, the need for further education, both vocational and technical, became apparent. Later, the emergence of junior colleges developed as a result of industrial America (Gutek, 1986).

The idea of remedial postsecondary education can be traced back to Charles William Eliot (1868) president of Harvard College, who in his 1869 inaugural address stated, "the American college is obliged to supplement the American school. Whatever elementary instruction the schools fail to give, the college must supply" (Inaugural Address, 1869). While developmental courses in colleges were not even in existence at that time, it was obvious there was something missing in American education that was leaving some students without the basics. Schools had an array of responsibilities thrust upon them in the expectation that they were preparing students with basic skills and "the skills of responsible citizenship; preparing young people for the world of work, for further education, and for adult family responsibilities; promoting personal and social development" (Flaxman & Passow, 1995, p. 33). However, it was becoming apparent that some students were not reaching these fundamental goals; hence, there was an increasing number of adults who had not mastered the basics, thus leaving them academically deficient. Literacy was one area where basics were not being mastered (Flaxman & Passow, 1995).

Adult literacy in the U.S. has historically been taken for granted. Children go to school and learn how to read, and, as adults, they continue this practice. However, in 1983 when The National Commission on Excellence in Education published *A Nation at Risk: The Imperative for Educational Reform*, adult literacy was shown as lacking. The report opened with the powerful statement "All, regardless of race or class or economic status, are entitled to a fair chance and to the tools for developing their individual powers of mind and spirit to the utmost" (p. 1). This statement was meant to show that children in the United States were not only given the "right" education, but that education was to help them to attain "mature and informed judgment needed to secure gainful employment, and to manage their own lives, thereby serving not only their own interests but also the progress of society itself" (p. 1). However, *A Nation at Risk* went on to explain that the educational system in the United States had succumbed to mediocrity, which had left our

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children lacking the "right" education and resulting in adults who were not able to function as educationally intended.

One risk highlighted in the report concerned individuals who do not possess the essential skill, literacy and training that accompanies competent performance in the work force causing both disenfranchisement and the inability to "participate fully in our national life" (A Nation at Risk: The Imperative for Educational Reform, 1983, p. 2). At that time, 23 million American adults were functionally illiterate "by the simplest tests of everyday reading, writing, and comprehension" (p. 3), and businesses and military leaders were complaining that they were having to spend millions of dollars on remedial education and training programs in such basic skills as reading, writing, and spelling. The minimum level of literacy needed to understand simple safety instructions was the ninth-grade level, and modern military training was at a much higher level of literacy. More and more young people were emerging from high school neither ready for college nor for the work force, hence, students needed an increased number of remedial college courses. "This predicament becomes more acute as the knowledge base continues its rapid expansion, the number of traditional jobs shrinks, and new jobs demand greater sophistication and preparation" (A Nation at Risk, p. 5). The problem of adult lowliteracy was growing, and this report was supposed to be the catalyst for reform.

A Nation at Risk was followed by a new, hopefully brighter, report in 2008 called A Nation Accountable. This report showed that the U.S. had made some strides but still remained lacking in the area of education. Nearly a third of high school students still do not take the rigorous course of study recommended in 1983 for all students whether they intend to enter college or move directly into the workforce. The Commission of this report was disturbed by the continued easy courses and curriculum offered to high school students and thereby producing adults who cannot navigate their way successfully in college. Reading scores have stagnated from 20 years prior, suggesting that just as many high school graduates were ill-prepared for adult level literacy; the report also showed that elementary schools are producing ill-prepared adolescents, who are becoming ill-prepared high school graduates. The problem of inadequate education has consequences, and these consequences are clearly being seen in the increasing number of low-literacy adults.

Another historical perspective which must be viewed is Knowles' (1973) concept of the andragogy, the process in which adults learn. Knowles (1973) devoted his life to adult learners and eventually concluded that the adult learner was unique and suggested the following guidelines to educators of adult learners: `"a comprehensive theory that will give coherence, consistency, and technological direction to adult-education practice" (p. 21). The technology of andragogy was to be a seven-step process. He called for instructors of adults to:

- set a cooperative learning climate,
- create mechanisms for mutual planning,
- arrange for a diagnosis of learner needs and interests,
- enable the formulation of learning objectives based on the diagnosed needs and interests,
- design sequential activities for achieving the objectives,
- execute the design by selecting methods, materials, and resources, and
- evaluate the quality of the learning experience while re-diagnosing needs for further learning (Knowles, 1973 p. 21).

According to the U.S. Department of Labor in 1991, low literacy costs the American economy \$225 billion in lost productivity (Wordpress, 2010). While large companies have put remedial skills training into place, 90% of American companies lack job training



programs. Jobs are being outsourced to countries where literacy is prevalent. Many jobs require functional reading skills, and companies are having a hard time finding qualified applicants. While it is expensive to initiate remedial training within companies, research shows that this training increases productivity far outweighing the cost of the programs (Wordpress, 2010).

Reading is a cycle. The more one reads, the better the reader, the more one reads and so on. So, the challenge for instructors of low-literacy adults is to get them to read more. To do so, they need to be offered opportunities they will enjoy and in which they can relate (Snow & Moje, 2010). Rush, Eakle, and Berger (2009) concluded that instructors of low-literacy adults need to develop engaging activities that involve students in authentic and purposeful reading. Cory (2008) advised that adult students are consulted about their particular curriculum giving them some say in their education making it relevant for them. She went on to state, "being attentive to students' lives and contexts is also a part of the goal of widening participation in further education on nontraditional learners" (Cory, p.65). While some strategies have proven effective in adult education, most adults need almost an individualized program in order to succeed (America, 2003). Although this is not feasible, it does have creed. Providing individualized goal-setting conferences, self-selected reading assignments, and reflective essays in an adult basic education course were three ways that addressed the unique needs of adult learners. Since studies have shown a correlation between self-efficacy and academic success (Cory, 2008; Knowles, 1986; Blaylock, Wiggs, & Lachowicz, 2008), the reflective essay bridged that gap by being a catalyst in self-efficacy. Considering the history of adult literacy, the conclusion drawn was that implementation of these strategies should have proven effective in the success of low-literacy adults.

Model – Research Design and Measures

This quantitative research study involved students from adult basic literacy courses at a community college outside Washington, D.C.. Two different sections of the same course were the study groups. These sections were of the same academic level, and students were placed in the particular course via their scores on a college entrance exam. One section of the course was completed with the reflective essays, individualized goalsetting conferences and self-selected reading projects implemented while the other section followed current course requirements without the aforementioned strategies, hence, the control group. This allowed for approximately 20-25 students in each study group.

Reflective essays caused the students to take time to consider their current literacy practices and what measures needed to take to be successful in the course. Making any informal literacy practices known and recognized is the first step for lowliteracy adults to even realize they participate in literacy (Taylor, 2006). Once they have reflected on their current literacy practices, they should be able to identify several personal goals that will aid them in successfully completing the class. Identifying and setting goals is a life skill, an area where adult learners need to recognize relevance (Blaylock, Wiggs, & Lachowicz, 2008). So, the idea of practicing and utilizing this life skill with low-literacy adults in their current basic education literacy course could prove effective in reaching success in the course while helping them to become more selfdirected and motivated in order to pursue literacy proficiency and ultimately to continuing their education. Research shows that adults respond to the concept of andragogy, the idea of adult learners not only having a say in their education, but actively participating in exercises that are relevant (Knowles, 1989). After writing their reflective essays, the students participated in individualized goal-setting conferences that allowed



the students to set and discuss personal goals regarding their progress in the course under the guidance of the instructor. The instructor followed up with each adult student to help revise goals and provide positive accountability two other times throughout the semester. These were in a one-on-one conference format with the instructor documenting each conference. Research documents that educators must acknowledge low-literacy adults' strengths and instruct accordingly for the students to be motivated (America, 2003). This acknowledgement may come in many forms such as giving frequent praise, emphasizing the skills and strengths the learner already possesses, and involving the learner in setting goals and objectives (America, 2003).

The self-selected reading projects took the place of the current book report format requirement in the adult basic literacy course at the community college. This allowed the students' input in their choices of literature while giving them the chance to choose reading that is relevant to their individual lives. In a study by Rush, Eakle, and Berger (2009), positive results were found when educators made a shift from reading as a cognitive activity to a social activity utilizing instruction that promoted the learners' interests and gaining literacy skills that transferred to academic situations. They also concluded that when adult readers engage in activities that they view as authentic and purposeful reading and writing, they move from the margins of literacy to fluency in all content literacy situations (Rush et al, 2009). Therefore, if low-literacy adults are given options for reading assignments and for self-selected reading projects, it should have a positive effect on their reading skills and achievement.

Measures - The initial measure was the college placement exam scores, placing students into the course. To answer Research Question 1 (What was the effect of individualized goal-setting conferences and self-selected reading projects on low literacy adults' successful completion of an adult basic literacy course?) and Research Question 2 (What was the effect of individualized goal-setting conferences and self-selected reading projects on low literacy adults' reading skills and achievement?) skills and achievement were measured by course tests, project grades and end-of-course grades. Other measures included completion status, final exam grades and attendance/participation grades. A preand post-survey was given for the measurement for Specific Research Question 4 (What was the effect of individualized goal-setting conferences and self-selected reading projects on low literacy adults' planning and anticipation of participation in additional postsecondary courses?) These surveys were identical and asked the students what their intentions were in participating in further postsecondary courses following the current remedial course. Progress was also evaluated by goals set and feedback documented during the individualized goalsetting conferences. Comparisons between the control group and the treatment group were analyzed from the above measurements. And finally, progress was measured by both quantitative and qualitative means. For the quantitative measures, both self-selected project grades and course grades were examined. For the qualitative measures, both the goal-setting conferences, which were documented by the instructor, and pre- and post-surveys regarding plans to further participate in postsecondary courses were utilized

Data Collection - The researcher collected data over the course of two semesters. During the fall semester, students in the control group participated in the adult basic literacy course just as the curriculum was outlined by the college. They completed an assigned reading project, which was in the format of a written book report, in accordance with an assigned novel. Participants were not given any opportunity for input on assignments throughout the semester. The researcher was also the instructor and followed the prescribed course curriculum while collecting data in the form of assignment grades, survey questions, attendance, and final exam and course grades. The semester ran from



the beginning of September through mid-December, ending with a predetermined final exam. This exam was given to all sections of the course by all instructors on the campus.

During the spring semester, the researcher taught the same developmental level of the adult basic literacy course implementing the three strategies: (a) goal-setting conferences, (b) self-selected reading projects, and (c) reflective essays. The prescribed curriculum was also utilized in conjunction with the implemented strategies, changing only the assigned reading project with the self-selected reading projects.

Analytical Methods - The experimental research project was a mixed-methods design that provided quantitative and qualitative data that the researcher collected, organized and analyzed. A QUAN-qual model was used according to Gay et al.'s (2009) definition, "quantitative data are collected first and are more heavily weighted than qualitative data" (p. 463). Quantitative data included assignment grades, course grades, class attendance, and final exam grades. Qualitative data included participation and intentions or changes in intentions regarding students' continuation of additional courses after the ABE course. Utilizing both quantitative data and qualitative data enhanced the researcher's ability to recognize and explain the relationship between gained literacy skills and achievement by implementing individualized goal-setting conferences, self-selected reading projects, and reflective essays as instructional strategies in an ABE course.

Analysis of quantitative data started with an independent samples *t* test to compare the means of the control group and the treatment group, determining the effectiveness of individualized goal-setting conferences, self-selected reading projects, and reflective essays as instructional strategies in an ABE course. Results of this test allowed the researcher to distinguish differences in the groups' performance throughout the course.

The researcher then used a 2x2 chi square test to evaluate course completion by the two groups, treatment and control. Data used for this analysis included participation and attendance, reading project grades, final exam grades, and final course grades. While the aforementioned data were utilized in this analysis, final course grades were the main determinant of course completion. Participation and attendance, reading project grades, and final exam grades provided insight to students' progress throughout the course. Chi square is used on simple nominal or ordinal data (Gay et al., 2009). Because pass or fail and group (control and treatment) are both nominal data, the 2x2 chi square was the most appropriate statistical analysis to determine the effect of the treatment on completion of the ABE course.

To determine gains in literacy skills and achievement, another independent samples *t* test was conducted. This test compared the control and the treatment groups' final exam grades which were used as a measurement of growth and achievement at the end of the course versus the beginning.

Finally, to make a comparative analysis between the treatment and control groups preand post-survey question regarding intentions of planning and participating in additional postsecondary courses, the researcher conducted a chi square test. Again, because yes or no (intentions to participate in additional courses) and treatment and control groups are both nominal data, the 2x2 chi square test was the most appropriate test for this statistical analysis.

Implementation – Process to Accomplish

Data were collected for this research project during a fall and then subsequent spring semester. Two sections of an adult basic literacy course at a community college in a D.C suburb were utilized in this research. Both sections were filled with students who placed into the course via the college placement exam, the Accuplacer. One section was used as the control group, following the scripted course syllabus and objectives. Through permission from the Chair of the Developmental Reading Department of the college, the other section fulfilled the course syllabus and objectives with the three aforementioned strategies



implemented by the researcher. Both classes were taught by the researcher. Because students were not randomly selected to the control group or the treatment group, but selected via the college placement exam, a quasi-experimental design was used for the study.

During the fall semester, students in the control group participated in the adult basic literacy course just as the curriculum was outlined by the college. They completed an assigned reading project, which was in the format of a written book report, in accordance with an assigned novel. Participants were not given any opportunity for input on assignments throughout the semester. The researcher was also the instructor and followed the prescribed course curriculum while collecting data in the form of assignment grades, survey questions, attendance, and final exam and course grades. The semester ran from the beginning of September through mid-December, ending with a predetermined final exam. This exam was given to all sections of the course by all instructors on the campus.

During the spring semester, the researcher taught the same developmental level of the adult basic literacy course implementing the three strategies: (a) goal-setting conferences, (b) self-selected reading projects, and (c) reflective essays. The prescribed curriculum was also utilized in conjunction with the implemented strategies, changing only the assigned reading project with the self-selected reading projects.

After researching adult learners and low-literacy adults, the ideas of individualized goal-setting conferences, self-selected reading projects, and reflective essays became apparent as strategies that could prove effective in teaching reading to low-literacy adults. In reviewing Knowles' theory (1989) that adults respond to the concept of andragogy, preferring to engage in practical and relevant curriculum, self-selected reading projects provide an opportunity for the required course reading assignment to be relevant as each student chose reading material that was relevant for him or her. Taylor's theory (2006) that low-literacy adults need first to recognize their current literacy practices before remediation can take place substantiated the strategy of individualized goal-setting conferences providing students with meaningful conversation with the instructor. Therefore, realistic and effective goals could be established. Reflective essays provided another avenue for the adult learners to look at their current literacy practices. These strategies empowered the low-literacy adult learners to become actively engaged in learning, and thereby increasing the likelihood of interest and success.

Results – Summary of the Findings

There were no significant findings regarding the effectiveness of individualized-goal setting conferences, self-selected reading projects, and reflective essays as effective strategies for teaching low-literacy adults. But when the final course grades of the Treatment and Control Groups were compared, the statistical significance was .079, which approached significant. Significance may have been attained had the sample sizes been larger.

When measuring successful completion of the adult basic literacy course, two different 2x2 chi squares were run with differing results. The first test compared the Treatment and Control Groups' completion status of the course. They either completed it or did not. No statistical significance was found in this test, but it was close to significant with .07. The second 2x2 chi square was used to determine if there was a significant difference between the Treatment and Control groups and their pass/fail status of the Adult Basic Literacy Course. This difference was statistically significant, $X^2(1) = 4.97$, p <.05, showing the Treatment Group's passing status higher than that of the Control Group (as shown in Table 1), which indicates that these strategies were successful in this area.

Table 1 - Descriptive Statistics forCoursePass/FailStatus

	Control		Treatment		
Variable	п	%	n	%	X^2
Pass/Fail Status					4.97
Pass	13	65.0	11	100.0	
Fail	7	35.0	0	0.0	
df = 1.					
* <i>p</i> < .05.					

Final exam grades were used to measure what the effect of individualized goal-setting conferences, self-selected reading projects, and reflective essays on low-literacy adults' reading skills and achievement, since that is the tool the college uses to measure progress in reading skills and achievement. There was no statistical significance between the two groups. But again, significance was measured at .057, which could have been significant with a larger sample size.

There was no statistical significance in the groups' measurement of anticipation of participating in further postsecondary courses when the researcher examined the pre- and post-survey questions that addressed this topic.

Conclusion

Although many of the results showed no significance, there were some very promising outcomes that could suggest further study in the area of low-literacy adults would be worthwhile. In the area of implementing individualized goal-setting conferences, selfselected reading projects, and reflective essays as effective strategies in teaching low-literacy adults, final exam grades and final course grades were used as a measure of increased literacy skill level and achievement. This practice is used by the college to promote students to the next instructional level. When these final grades were compared between the two groups, no significance was found; yet the comparison was very close to yielding significance toward the Treatment Group outperforming the Control Group. Substantiating additional studies with a larger population could prove effective.

In the area of successful completion of an adult basic literacy course, the implementation of the aforementioned strategies proved significant in one measure and very close to significant in the other. Both students' pass/fail status and completion status were measured for this research question. The Treatment Group's pass/fail status was significant, and their completion status was close to significant at .07. Since these areas are closely linked and showed a positive result, it would be beneficial for future researchers to concentrate on successful completion as a goal in adult basic literacy. These adult learners responded to interaction with the instructor. Students were both excited and motivated when given the opportunity to have autonomy in setting personal goals and choosing their literature and project in this course. This practice supports Blaylock et al.'s (2008) conclusion that



adult learners desire to be actively involved in the learning process. It also suggests that when the instructor steps back and "changes from dispenser of knowledge to facilitator, coach, and guide, that students cease to be empty vessels receiving knowledge and become active participants who take responsibility for their own learning" (Flaxman, Ascher, Berryman, & Inger, 1995, pp. 145-146).

Retention in adult basic courses has always been a challenge. This study proves that retention is possible when the needs of the adult learner are met and their input is valued. Massengill (2004) concluded that adult learners have a more positive attitude toward education when they see gains in their skills, so successful completion of an adult basic literacy course is critical if further education is going to be a reality in the life of a low-literacy adult.

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Brief biography of the author

Karin Rodrick earned a Bachelor's degree in English education and taught middle and high school English and Language Arts in both private and public schools for seven years before pursuing a Master's degree. She completed a Master's of Education degree with a Reading Specialist's certificate while continuing to teach English and Reading. Prior to beginning her doctoral studies, she began teaching at the collegiate level part-time while still teaching high school English and ESL. This part-time college experience put her into the realm of Developmental English and Reading, this is the level of instruction for students who enter college not able to do college-level work because they lack both literacy and English skills. Working with these underprepared college students was the catalyst for her research for her doctoral dissertation. After a year as an adjunct, Karin was hired fulltime by a college just outside of Washington, D.C. She completed her Doctor of Education in Leadership and Practice in 2013 and continues to teach both Developmental and credit-level students. While this paper is a compilation of some of her research, she has recently begun looking outside the US for solutions to low literacy. The US does not rank in the top 25 countries when measured for literacy ability, so Dr. Rodrick is currently researching best practices in some of those "top" countries. She is very interested in methodology of literacy instruction in regards to integrating language and how other successful countries achieve this.

Teaching English Technical Terms in the Domain of Hydrology with Cooperative Learning

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Abstract

The purpose of this paper is to underline the benefits of teaching technical terms with Cooperative Learning strategies. The technical terms under discussion are from the domain of hydrology and water management. The technique of cooperative teaching is proposed as presented in the paper *Educating for action: Aligning skills with policies for sustainable development in the Danube river basin*, by Kenneth Irvine, Gabriele Weigelhofer, Ioana Popescu, Ellen Pfeiffer, Andrei Păun, Radu Drobot, Gretchen Gettel, Bernadette Staska, Adrian Stanica, Thomas Hein, and Helmut Habersack (2015). The article discusses workshops and skills development and it is centred on the field of study of students at the University where I teach English language seminars. In this paper I propose a way to include technical terms in the teaching process and motivate the students by showing them that these activities will help them both to memorize terms and to use them in a cooperative way, eventually helping them build skills relevant to their future careers.

Keywords: motivation, vocabulary, translation, engineering **Main Conference Topic:** Educational Psychology

Introduction

Many professions require knowledge of English, which serves as an international language for exchanging ideas and establishing business relationships. Engineering is no exception. Teachers of English for specific purposes need to take into account the fact that Engineering students need to know specific scientific terms, as well as refresh the grammatical rules they have already studied in high school. Techniques for teaching vocabulary vary: from memorizing the terms found on a list or looking them up in a dictionary and matching them with their definitions; to dialogues between students explaining in colloquial language what a certain term means; to using diagrams, pictures, or drawings; to using cards with true or false statements, cards for making classifications, and so on; to word games and other techniques, such as graphic organizers (Carrier).

One question concerning the teaching of vocabulary has to do with whether the definitions of scientific and technical terms should be taught "before, during or after the reading assignment," (Memory 1990). Memory concluded that the timing of the explanation made no difference. This could be because certain terms can be inferred from context. Even if the students do not completely understand, they still get a vague idea of the terms' meaning. Later, when the terms are explained, the students memorize them and use them later in the correct context. Contextualizing is one effective technique for the teaching of science vocabulary (Young 2005). Students establish relationships (Young 2005) by guessing



meaning from the context of the text used for the reading assignment: they make connections with other words from their scientific vocabularies and other English words they already know. A reading assignment where there are scientific terms facilitates the use of other techniques for the teaching of vocabulary, as students can apply the science they know to the reading and fill in the gaps in their understanding of the English used.

The teaching of scientific and technical vocabulary should not only focus on revealing the meaning of terms, but also on techniques of teaching. Which technique is more effective in teaching scientific and technical vocabulary: self-learning; being taught by one or two teachers; or group work? Styles of learning vary from person to person. Yet cooperative techniques of teaching suggested in the paper *Educating for action: Aligning skills with policies for sustainable development in the Danube river basin*, by Kenneth Irvine, Gabriele Weigelhofer, Ioana Popescu, Ellen Pfeiffer, Andrei Păun, Radu Drobot, Gretchen Gettel, Bernadette Staska, Adrian Stanica, Thomas Hein, Helmut Habersack (2015), and which refer to the domain of engineering, namely hydrology, can be helpful, regardless of the personalities of the learners. This type of teaching can encourage students to cooperate with each other on a project:

"When people can effectively interact with others and learn through a cooperative framework, interpersonal skills and positive attitudes to problem solving tend to follow (Johnson and Johnson, 1989, 2009)." (2015: 8)

While working together to learn technical terms, students will also acquire a new skill, that of cooperating within a group on a common project. This is helpful for the future because, as future engineers, students will find themselves in situations where they will need to establish business relationships.

2. If we look at two papers from the domains of hydrology and water management, *Educating for action: Aligning skills with policies for sustainable development in the Danube river basin*, by Kenneth Irvine, Gabriele Weigelhofer, Ioana Popescu, Ellen Pfeiffer, Andrei Păun, Radu Drobot, Gretchen Gettel, Bernadette Staska, Adrian Stanica, Thomas Hein, Helmut Habersack (2015), and *VIrtual CAmpus In Hydrology And Water REsources* (VICAIRE), by André Musy and Radu Drobot (2014), we see that the first one focuses on professional skills in education, as well as on actionable knowledge, and the second one on developing textbooks on the basis of hydrology curricula. The examples given in the second paper also contain print screens of the texts for reading and multiple choice texts that can be used for Reading Comprehension and adapted for use in English language seminars.

3.

4. The focus on problem-solving through cooperation is found in both papers. The first paper suggests workshops as a way of learning:

"Training workshops offer opportunities to learn specific methods, upgrade skills and gain insights into multiple disciplines. Mostly offered in the form of summer or winter schools, workshops are generally short-term, centrally organised, and target all levels of education (technicians, undergraduates, postgraduates, professional scientists)." (2015: 6)



Workshops offer the occasion to meet people, cooperate through common activities, and develop problem-solving skills. This type of activity can be adapted to English-language learning seminars during which students will be taught how to work efficiently with technical terms. From pair work to group work, we have the beginning of problem-solving activities that will develop the students' collaboration skills. The students can decide for themselves who in their group will do a certain task, such as searching for the translation of the terms, searching for dictionary definitions, creating sentences with the terms, and finding them already used in context.

Theory

Oxford (1997) discusses three concepts related to interaction and cooperation during the learning process for second language learning. The first one is cooperative learning, already discussed in the paper about hydrology. The second concept is collaborative learning, and the third is interaction itself. According to Oxford (1997: 443),

"These three strands have different connotations, which, when understood, can help **us** better comprehend language learning and teaching. Cooperative learning refers to a particular set of classroom techniques that foster learner interdependence as a route to cognitive and social development. Collaborative learning has a "social constructivist" philosophical base, which views learning as construction of knowledge within a social context and which therefore encourages acculturation of individuals into a learning community. Interaction is the broadest of the three terms and refers to personal communication, which is facilitated by an understanding of four elements: language tasks, willingness to communicate, style differences, and group dynamics."

Thus, through these methods, learning can become more efficient through the sharing of knowledge, not only between teacher and students, but also among the students themselves. Students use the process of communication, which is natural in any social context. They interact and learn together, each searching for and processing information, then discussing their findings with their group.

Rather than working individually on technical terms, then verifying their findings with the teacher, the students get a chance to reflect on and debate their understanding in groups, get confirmation or contradictions, then agree on certain results to present them to the teacher and to the rest of the class.

This type of learning process mirrors collaboration undertaken by professionals who are creating dictionaries and glossaries of terms. When creating a dictionary or glossary, one needs to check various sources, and, as in any process of translation, one can resort to asking the author of the original text for confirmation or more information about what a certain term means and if that term and not another one should be used.

The issue of collaborative learning has also been under discussion with engineering students, as can be noticed in the paper by Stump, Hilpert, Husman, Chung, and Kim (2011: 475-476):

"Traditional engineering educational strategies such as lecture, lab experiences, and homework have been criticized because they inadequately prepare engineering students to engage in the collaborative partnerships that are essential for the practicing engineer (Kalonji, 2005). These methods have also been criticized because they promote passive learning and a



compartmentalized curriculum that may not prepare students for the innovative and flexible role of engineers in today's society (Duderstadt, 2008; Guzdial et al., 2001; Heywood, 2008; Prince, 2004). Suggested reforms to engineering education have included incorporation of collaborative learning in the curriculum as a means of preparation for future practice. Research has shown a more immediate benefit of collaboration, in that this more active form of learning can also positively influence students' achievement, persistence, and attitudes about learning (Bowen, 2000; Prince, 2004; Springer, Stann, & Donovan, 1999)."

The general tendency toward active learning in the teaching of English language seminars shows the necessity of applying this method to the way other engineering subjects are being taught. Students at the Technical University of Civil Engineering Bucharest always prefer a practical approach to teaching and learning. They prefer to be actively engaged in the process of learning, and think about the way the skills they gain in university will help them in their future careers. If they wish to get involved in international projects later, collaborative learning can obviously be of great help to them. Some students may eventually wish to translate their own papers and presentations, and they may need to create glossaries. They can also present together with a colleague. Learning how to collaborate on a task can be of great use to them.

Methods

Depending on the size of the task, technical terms can be taught through pair or group work. For a concrete task, the teacher can present the students with texts and ask them to extract the technical terms from the domain of hydrology, then search for definitions, underline the context where they are used, and then create sentences with these terms in new contexts. Depending on the size of the text and number of terms, pair work or group work may be helpful. However, as the task is quite complex (searching for terms, searching for definitions, translating, and creating new contexts) a group would be recommended, with students assigning these various tasks to each other, then discussing and agreeing to complete their common project.

Teachers usually associate pair work and group work with the opportunity for their students to communicate in the foreign language they study. Teachers can divide the students into groups or let students work with whom they choose. The activity can be used to get students to work together not only with their close friends but also with anyone else. While collaboration is encouraged at group level, the activity can also be set as a competition between groups, but later as a further collaboration in which all of the groups put together a glossary of terms at the end of the activity. The activity can be designed so that students learn to work with colleagues with different psychological makeups, and to help them adapt to others' styles of work and personalities in order to work efficiently together.

At the same time, using the respective technical terms, and working with them will facilitate students' memorization. As they ask themselves and the other members of the group for confirmation of the terms' meaning and use, they will better retain their translation, definition and context of use.

Stump, Hilpert, Husman, Chung, and Kim (2011: 476) introduce the concept of motivation when it comes to individual and collaborative learning. According to them (2011: 475), "Research has shown that collaborative learning positively influences student achievement." Students can get more answers and more tasks done if they ask for a second opinion from someone in the group. When students work alone, they receive no suggestions,



confirmations or contradictions from their peers; this can leave them with a sense that their work has no purpose.

Findings

The study done by Stump, Hilpert, Husman, Chung, and Kim (2011: 475) illustrates some general tendencies of collaborative learning among students. They studied engineering students, which is helpful as engineers likely have a certain psychological tendency in regards to learning which needs to be taken into account for foreign language teaching as well. The study tested some hypotheses: "A set of hypotheses were tested that predicted positive relationships between students' self-reported informal collaboration, self-efficacy for learning course material, knowledge building behaviors, and course grade. A second set of hypotheses were tested that predicted gender similarities in reported self-efficacy, and gender differences in reported collaborative learning activities." The hypotheses could be adapted to students of engineering at the Technical University of Civil Engineering Bucharest who prefer to collaborate when doing tasks for their engineering subjects rather than work alone. The study presents the following findings: "In study 1, students' reported use of collaborative learning strategies and reported self-efficacy for learning course material were significantly predictive of their course grade. In study 2, female students reported greater use of collaboration as a learning strategy than their male classmates; among male and female students combined, those who received "B's" in their engineering course reported more collaboration than their peers who received "A's" or "C's" and lower." We could draw parallels with general observed tendencies in psychology claiming that females have better collaboration skills than males. However, most students in the Technical University of Civil Engineering prefer collaboration to working alone, and this tendency can be noticed in foreign language seminars as well.

Discussion

The general preference for collaborative learning among students can be due to the fact that they gain more confidence while working and discussing with colleagues before presenting their work to the teacher. Other colleagues share different experiences and different knowledge; they add their skills and contribute to a better understanding of the task, and to a better result:

"When students have the opportunity of working jointly together to construct new understandings, they develop an understanding of the unanimity of purpose of the group and the need to help and support each other's learning (Gillies & Ashman, 1998; Johnson & Johnson, 1990). In so doing, they often provide information, prompts, reminders, and encouragement to others' requests for help or perceived need for help." (Gillies 2006: 272)

Peer work can be seen as a way for students to stick together, support each other, and encourage each other, and help each other with their work. At that age, students often prefer to communicate and enjoy establishing friendships and meeting new persons. They are curious about their colleagues' ideas and experiences.

A benefit of their wish to communicate is that they are well-suited for learning with collaborative strategies. They have the wish to cooperate and, by using this method, the teacher can help refine their collaborative skills.



Since there is so much work involved, collaborative learning is well suited to the process of understanding how to use technical terms in the correct context, and understanding what they mean. If students collaborate well with each other, the activity can be very useful for everyone, students and teachers, and, if the resulting glossary is good enough to be used as a model, for future classes of students as well.

Conclusions and Implications

Collaborative learning can be seen as a type of class engagement. Activities based on collaborative learning can increase the students' motivation to work, since they know they can reach results with the help of the other colleagues. They also know that such activities can be fun since they get to speak with their colleagues during class, do research, and feel that they are doing something practical. At the end of the activity they will have created a glossary of terms that can help them with future work. Smith, Sheppard, Johnson and Johnson (2005) write about student involvement promoted by pedagogies of engagement. They define pedagogies of engagement in the following way:

"To teach is to engage students in learning.' This quote, from *Education for Judgment* by Christensen et al. [9], captures the essence of the state of the art and practice of pedagogies of engagement." (2005: 88)

The task proposed for the collaborative learning activity for understanding and using technical terms can be included within the domain of pedagogies of engagement. There are tasks such as this one which require implication and involvement on the part of the students. Teachers need to resort to motivation techniques, and pedagogies of engagement seem to offer the answers. What is more, searching for the right teaching technique needs to take into account the general psychological tendencies of the students we work with.

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Brief biographies of the author

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Language Policy in the British African Colonies

the case of British West Africa

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Abstract

Gradual official concern for colonial education was closely linked to continuous reconstruction of colonial relations within which it was subordinated to the primacy of the imperial production pattern. Given the great range of native languages, lack of European expertise, supremacist ideology, together with diversion of financial resources for British imperial survival and academic prestige, British officials had to find a way how to balance between what was educationally desirable and politically and financially unavoidable. The Colonial Office education advisory committees could but maintain the prevalence of English at post elementary levels given the officials' miscalculated perspective of indefinite British colonial rule and forced integration of export-oriented colonial economies for the survival of the Empire.

Keywords: languages, policy, Colonial Office, education

Conference topic: AC-ETel, 2017

Introduction

Being an immutably inherent process of human existence, culture contact involves relations between dominating and dominated different groups whose respective forms of domination and response thereto are generally conveyed through, among channels, language. Though the choice of a commonly used language is logically determined by socio-linguistic and demographic criteria, history shows that it can be imposed by politically dominating minorities as in the case of African colonies. A number of academics have examined the question of language in colonial context, namely Ashby, Maxwell etc, but the paper attempts to present both Officials' and advisers' attitude with regard to the language issue, and examine the educational, social, political and economic factors that might have determined colonial language policy.

Background

English colonial establishment in coastal West Africa starting by 1808 in Sierra Leone, 1821 in the God Coast, and 1862 in Nigeria, and extended progressively by 1900 to their respective northern protectorates, could be regarded as being partly a transplantation of the prevalent production pattern in England based on laissez faire policies and church monopoly over education (Barnard, 1961, Ashby). In fact, a number of various missionary societies had



already initiated primary schools with the primary purpose of converting people into Christianity before a Board of Education in each of the British West African colonies could be established in 1882 providing them with a relatively small colonial government financial assistance. Though few of the schools, known as vernacular schools, provided instruction in vernacular languages for religious purposes, most of them used English with English-based curricula.

The strong sense of paternalism and a sense of savoir obeir inculcated in colonial schools discriminated African values and reinforced the belief in the absolute superiority of the White man, which made West Africans more receptive and submissive to colonial propaganda. This misconceived and failing type of education, as reported by the American Phelps Stokes Commission of 1920, was considered as inadequate and not adapted to the needs of native populations (Phelps Stokes, 1920). The Commission's criticism together with the inability of the missionary societies to meet Africans' increasing demands for education in a postwar slightly challenging context pressed on one hand Colonial Office officials to depart from laissez faire so as to gradually become more concerned with colonial education, and on the other drew the attention of few unofficial and academic institutions.

Besides the Imperial Education Conferences (1910 and 1923), the Colonial Office Advisory Committee for Education in the Tropical African Dependencies (set up in 1923 and then extended to all the colonies in 1929), with its sub-committees and commissions (Borsali, 1986), and the British Council (set up in 1936), other bodies were involved in a way or another whether for textbook design, organisation of examinations, teacher training or mass education for all these questions are closely related to the language issue. They included the School of Oriental and African Studies founded in 1916 (initially known as School of Oriental Studies), the role of which was to advance scholarship, and train colonial officials; the 1920 American Phelps Stokes Commission for education in Africa; the International African Languages and Culture established in 1926 (London), the International Committee on Christian Literature for Africa; both of London University's Institute of Education (founded in 1929) and Colonial Department (set up in 1934), Durham University, Cambridge School Certificate Syndicate, Oxford Examination Board, and London University Matriculation Board.

Language policies

The various reports of the bodies mentioned above show the very complex implications of the language issue especially in a colonial context; while the 1847 Report of the Education Committee of the Privy Council to the Colonial Office had stressed among other principles the inculcation of the principle of Christianity and the knowledge of English as an agent of civilization (Foster, 1965); the 1917-19 Calcutta University Commission had given primary importance to the use of the mother tongue in education for "through it the infant learns to name the things it sees and feels...it is the mother tongue, which gives to the adult mind the relief and illumination of utterance," but the Commission added that" for the educated Indian of today, the master key is English, English is then indispensable to the higher education of India at this time." Considering the multiplicity of native languages, some of which were fully developed and others still mere spoken dialects, the American Phelps-Stoke Commission, which visited Africa after the First World War, were of opinion that it might take years of scientific study so as to determine the comparative merits of each. But they insisted on the fact that 'tribal language should be used in the lower elementary standards or grades; a lingua franca of African origin should be introduced in the middle classes of the school if the area is occupied by large native groups speaking diverse languages, and the



language of the European nation in control should be taught in the upper standards.' Three years later, the Imperial Conference held in London in 1923 considered the vernacular as the language best known and understood, and the most effective medium of instruction in the preliminary stages of school education (CO 323,1927). This kind of approach was reiterated by the Ormsby Gore Commission to East Africa in 1924 which regarded it essential to keep a native language as a medium of instruction in the elementary and primary stages, and then to introduce English at a later stage when learnt properly (Cmd 2387, 1924). One year later, the Colonial Office Advisory Education Committee expressed its educational doctrine in its 1925 White Paper adhering clearly to the principle that education should be "adopted to the mentality, aptitude, occupations, traditions of the various people...this education would emphasize the study and use of the vernacular" (Cmd 2374, 1925).

The Colonial Education Committee appointed a first sub-committee in December 1926 to deal with textbooks which could be used in the African colonies, and then a second one in 1928 to deal with African education reports. The difficult language issue was referred to again in 1926 when Ormsby-Gore, the Colonial Office Parliamentary Undersecretary (1924-1929), visited British West Africa, underlying the difficulty to lay down one uniform language policy given the existence of an English speaking community on the coastal areas and various ethnic tribes speaking their own in the interior and for whom instruction should start in the vernacular (Cmd 2744, 1926). One year later, the Advisory Colonial Education Committee submitted a memo on the place of the vernacular in native education in which reference is first made to approaches and principles adopted in previous reports as regards difficulties connected with the training of teachers in a variety of native languages, production of textbooks and literature besides the financial implications connected therewith. However, the report points to a relatively satisfactory situation in which some colonies succeeded in using commonly some vernaculars in schools. As far as British West Africa is concerned, Yoruba, Ibo and Efik were used in the southern provinces of Nigeria, Kanuri in the North East while Hausa and Nupe in the North. As to the Gold Coast, Akan was used in large areas of the eastern and central provinces, Fanti in the central and western provinces while Ewe extended through southern Togoland. In Sierra Leone, while the colony was predominantly English speaking, the Protectorate had two principal languages: Mende and Temne. The report underlines the common agreement as to the use of vernaculars as a medium of instruction in the first stages of elementary education, stressing however that the necessity for European teachers to be become familiar with one vernacular so as to provide instruction in specified subjects. On the other hand, the report put emphasis on the necessity of learning English as 'a means to a wider intellectual life' and door to scientific and technological advance'. It regards the use of English as a necessity in all in intermediate, secondary and technical schools (African n 110, 1927). Subsequently, a memo on the preparation and selection of English reading books for non English speaking pupils was prepared by the Colonial Education Textbook Sub-committee in 1929 with the object of investigating the existing supply of reading books in English for non English-speaking pupils.

The subcommittee members felt that the memo should be communicated to both colonial governors and educational publishers, keeping in mind that textbooks should enable pupils to understand written English, become well acquainted with it for higher studies or professional purposes, and learn about English life, ideas and literature (CO 323/ 1029/60197/11/ 1929/ 60351/1929). This raised the question of educational inadaptability as illustrated in textbooks and in external examination requirements, which the 1932 Currie's subcommittees, the 1935 territorial conferences of the Colonial Directors of Education, as well as in 1937 De La Warr's *Report on Higher Education in East Africa* rejected. The latter stated clearly that 'a



knowledge of English should not separate the African from his community' (Col 142, 1937). The Secretary of State, M. Macdonald, went even further to prohibit the use of such textbooks on certain objectionable moral or political grounds, being inappropriate, educationally unsound, or highly expensive with reference to local conditions (CO 987/14/1939).

The growing importance of colonial education in the early 1940s became evident within the framework of colonial development and welfare policies. In fact, the British Council became associated with the Colonial Office for cultural educational and activities in British West Africa from 1941; the Colonial Education Committee submitted two reports in 1943 dealing respectively with Adult and Mass Education, and Language in African School Education, and the Colonial Office appointed the Asquith and Elliot Commissions to deal respectively with higher education in the colonies and in British West Africa. The members of the Colonial Education Committee were convinced that popular mass education should be based on literacy in the mother tongue provided that production of a vernacular literature in quantity and variety could be available. Arguing that some of the vernacular languages could not bear the burden of instruction beyond a certain stage, the Colonial Committee reiterated in its report on Language in African School Education the obvious option stated in the previous reports and memos, and they argued that the main pupils' parents' incentives for the acquisition of English were basically socio-economic and warned that " any attempt, therefore, to delay unduly the introduction of English into African schools would be regarded as the attempt of government to hold back the African from legitimate advance in civilisation" (CO 987/147, 1943). The prevalence of English was not questioned by the 1945 Asquith Commission's Report on Higher Education in the Colonies, it examined however the contribution of the university with regard to the study of African vernacular languages estimated at 700, though a dissenting member, Sir Richard Livingstone had objections to keeping languages alive while having no literature to justify their survival. The same approach was adopted during the 1947 conference of Colonial African governors emphasizing clearly the use of English as the main language of instruction except at the lowest levels of education, and use of simplified English in mass education campaigns, while keeping indigenous languages for rural areas mass literacy work (CO 847/ 37 /47242/ 1947).

The approach to the language issue as expressed in this chronologically stated language policy, cannot be reasonably understood without referring to interrelated educational, economic, financial and political factors that might have to some extent determined such choice.

Educational arguments

The existence of a large variety of African languages could undoubtedly present serious educational challenges, especially the training of teachers, printing of textbooks and eventually translation from English in a variety of vernacular languages. But it was rather the divergent approaches to their classification due to some lack of expertise and misconception with regard to the literary productive capacities of native languages together with some apathy towards colonial education that it was easier to impose English as a medium of instruction. It should be noted that German scholars and missionaries had elaborated a number of dictionaries, and produced common native languages in some areas as in the case of Yoruba in Western Nigeria or Swahili in East Africa (Alexandre, 1972).

On the other hand, it cannot be denied that colonial language policy was greatly determined by the examination factor. The Phelps Stokes Commission reported that demands of Oxford



and Cambridge Local Examinations in the British Colonies 'compelled all secondary pupils to take subjects required only by the few who might proceed to European universities.' The inadaptability of the examinations to local requirements had been a major challenge for the Colonial Office Advisory Education Committee due to its great Oxbridge membership and lack of control over the examining bodies. Financial profits deriving from Oxford and Cambridge examinations and those of London later were the real motives as reported by Pickthorn of Cambridge University (CO 885/41, 1936). The negative consequences of the external examinations were not inherent in the fact of their being external, but in the character of the examination itself. The "Made in England" became the hallmark for certificates and degrees to be taken by Africans given the lack of local higher education facilities. In fact, apart from Fourah Bay College, a missionary-owned institution in Sierra Leone, a university department at Achimota College in the Gold Coast (from 1929), and Yaba Medical School in Nigeria (from 1932), higher education institutions were still considered by the 1939 British West African colonial governors' conference as an ideal for political and economic reasons. (CO 554/121/33599/1939). The European typical response to higher education was that the Africans were not ready for it.' (Wraith, 1967).

Political arguments

Imposing English as a medium of communication and instruction seemed logical in the framework of colonial rule, and it was obvious for colonial governors that administrative and political work had to be entrusted to exclusively British officers, whose Secretary of State for the colonies, M. Macdonald did not hesitate to stress in 1938 that it " would take generations or even centuries for some of the colonial people to stand on their own feet and attain selfgovernment"(HCD, December 7, 1938). Such miscalculated perspective was based on the use of illiterate chiefs as the main political collaborators within the framework of Indirect Rule and within the partly transplanted metropolitan representation parliamentary system through which the traditional rulers could outnumber the new social category of western educated Africans, though the latter could be regarded as the result of a successful response to the culture of Western Europe as received for the most part through the filter of colonial society. This western educated elite who could consolidate the prevalent use of English while being employed more economically than expatriates in government services, was rather excluded from government senior posts. It was certainly difficult for expatriates to give up lucrative advantages and accept 'equal pay for equal work' principle as claimed by the newly African director of Education in the Gold Coast in appointed 1942 (CO 554/128/33594/1942).

Economic and financial Arguments

However good and reasonable British officials and education advisers ' intentions with respect to language policies were, they were eventually determined by economic and financial considerations within the framework of the imperial and colonialist production pattern. Laissez faire philosophy or colonial financial self sufficiency constituted the driving force of colonial management, but diversion of financial, human and material resources together with commercial monopoly over colonial products under protectionist measures, and budgetary allocations for colonial government expatriate personnel could but reduce financial allocations to educational development.



In fact, the Secretary of State's statement after WWI that' the colonial assets should be taken over and exploited on a large scale by the British Government and the profits should be used to pay off Britain's debt" was almost repeated during WWII when the Colonial Secretary, Lord Moyne (Feb.1941-Feb. 1942), stressed the need "to regulate the use of resources in the interest of both the general war effort and the well being and development of the colonial empire; to reduce consumption by taxation direct or indirect; to save actual material resources in personnel; to organize propaganda for various schemes; to encourage various gifts and free interest loans." (Cmd 6299, 1941). Economic help to the UK from June 1943 to the end of the War in raw materials was valued at £31,351,000, and about £22,556,000 were shipped from British colonies to the USA, enabling Great Britain to earn dollars (Colonial reports and CO96/765/31080/1940). Not surprisingly, Oliver Stanley, Conservative Colonial Secretary (1943-45) had to convince the British Treasury that the extension of the 1940 policy of Colonial Development and Welfare "would prove beneficial to Britain, and would in the long term benefit Britain, either in the form of increased export of colonial commodities, which otherwise Britain would have to obtain from hard currencies, or in the form of increased export from the colonies as part of the Sterling area to the hard currency country outside" (CO 852/588/19275/1944).

The direct financial colonial contributions during the World Wars exceeded by far what Britain could have loaned under 1940 Colonial development and Welfare Act, for example, the colonial government of Sierra Leone offered a sum £756.000 over three years, that of the Gold Coast offered £6,972,731 in addition to private gifts amounting at least to £931,127 (Colonial Reports, 1946). Again, given the postwar crisis, and even worse, the British Treasury acted contrarily to the spirit of C.D.W when it decided to exact a sum of £100 million out of the £800 million, amounting to one eighth of the colonial sterling balances held in London, regardless of the sacrifices and contributions made and offered in human beings, material and financial resources to Britain during the War (T 236/ 51). Besides the direct financial benefits from colonial domination, commercial monopoly over export-oriented colonial economy was part of the imperial production pattern making colonies sources of suppliers of raw materials and consumers of metropolitan manufactured goods One may wonder how a colony that had, in British Officials' mind, to be financially self sufficient on one hand and to remain basically the importing market of more expensive and partly unnecessary metropolitan industrial products on the other, could accumulate capital for starting secondary industries while nearly half its revenues, as in the case of British West Africa, were allocated for the payment of salaries and pensions of expatriates (Hopkins, 1973), and colonial governments having to pay for the services of the Colonial Office Advisory Committees in London (CO-CDAC 1940 and CO 859/1/1201/1/D/1939).

Conclusion

The language question in colonial context was multidimensional and could not be confined only to linguistic criteria as stated in the various memos and reports; it rather involved more complex educational and political issues for which the advisory bodies were not well prepared nor had they the prerogatives to deal with. However good and trusty their intentions and recommendations were, a few officials and educationists could not change radically the colonialist and imperial production pattern and abandon valuable colonial assets and Eurocentric supremacist ideology in the name of civilisation, democracy and equality of cultures.

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Brief Biography

Professor of West African Colonial History, (Ph. D Aberdeen University, UK 1983), with long experience in University administration (Head of Department to Vice Chancellor). Participated in international conferences and published papers on former British West Africa Colonial History.



School Psychological Counselors' Opinions about Causes & Consequences of Cyber bullying&Preventive Policies at Schools

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Abstract:

Cyber bullying is increasing among students by excessive use of technology and defined as "an aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly and over time against a victim who can not easily defend him of herself". Especially for the Z generation who use internet excessively, under the risk of cyber bullying. Cyber bullying have negative impacts on students psychological well being, social relations, academic performance. In Turkey, each school has guidance service & psychological counselors who work for students' well being. They are rich resources to understand dynamics behind the cyber bullying. This study aims to determine the opinions of school psychological counselors on causes, consequences of cyber bullying and recommendations about preventive policies. In this study, qualitative method was used. Data collected through the focus groups interviews with 15 senior school psychological counselors. Data were analyzed by content analysis.Findings show that causes and consequences of cyber bullying collected similar themes such as psychological problems, social & communication skill shortage, anonymity of internet, need to develop ethic norms for cyberspace, lack of parental awareness and supportive school climate. In order to prevent cyber bullying, increasing awareness of cyber bullyingat individual, institutional and societal level, social skill development programs, safe and supportive school climate, psychological counseling were recommended.

Key Words: Cyber bullying, School Counseling, Educational Psychology, Student, School Management

Conference Topic: Educational Psychology, Education practice trends and issues

Introduction

A relatively new form of bullying (Ptaszynski et al., 2016), *cyberbullying* refers to "Any behavior performed through electronic or digital media by individuals or groups that repeatedly communicate hostile or aggressive messages intended to inflict harm or discomfort on others" (Tokunaga, 2010,278). Cyberbullying has become a growing concern worldwide, especially among children and adolescents (Ang, 2015; Chan & Wong, 2015; Ptaszynski et al., 2016). While a study conducted with 14–17 year olds in six European countries revealed that 21.4% of participants reported cybervictimization in the previous year (Tsitsika et al., 2015, 1), another found that 69% of 13–22 year-olds in the UK have experienced cyberbullying and that 20% of such cases were extreme (Childline, 2014, cited by El Asam, 2017,129). Moreover, cyberbullying seems to be prevalent regardless of country. Whereas cyberbullying in Spain was estimated to involve 32% of the adolescent population (Buelga, Cava, Musitu, & Torralba, 2015), among students in South Korea, the figure was 34% (Lee & Shin, 2017).

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Cyberbullying can take various forms, includingmasquerading, flaming, harassment, outing, trickery, exclusion, denigration, impersonation, and cyberstalking (Bamford, 2004; Willard, 2007). Cyberbullying behaviors include flaming includes sending angry, rude, vulgar messages; harresment is sending offensive messages repeatedly; denigration is posting harmful and untrue comments or materials about person; masquerading includes sending materials about a person by creating secret identity; outing&tricery is sending of a persons' intimidating private message or images; exclusion is excluding someone from an online group (Trolley, Hanel & Shields, 2006). In the literature cyber bullying is often associated with social, ethical psychological, factors especially aggressive behaviors(Chan & Wong, 2015).

Psychological factors play an important role on cyber bullying as a reason or a result.For example impulsivity, empathy (Erreygers, Pabian, Vandebosch & Baillien, 2016), trait anger (Wang, Yang, Yang, Wang & Lei, 2017), narcissism, psychopathy, personality traits (van Geel,Goemans,Toprak & Vedder,2017), aggression (Ang, 2015), self efficiecy & moral disangegament (Bussey, Fitzpatrick & Raman,2015). Udris's (2014) study with 887 high school students show that online disinhibition was significantly associated with cyber bullying. Another study reported aggression and succorance positively predict cyber bullying(Dilmac, 2009).There is a relationship between cyber bullying victimization and psycho-physiological stress(González-Cabrera et. al, 2017).Pabian,Vandebosch, Poels, Van Cleemput & Bastiaensens's study (2016) which conducted with 1412 adolescents in Belguimalso found that adolescents who have higher levels of empathic responsiveness that they experience more often witness.

Not only psychological factors but also social factors are effective in cyber bullying. For instance, the system of values and moral development of the cyber bully, the victim and the audience. A research conducted on 563 students found that cyber bullying was related to individual and social values and that those that have high moral values intervened more with the cyber bullying incidents(Allison & Bussey, 2017). Several psycho-social variables such as inability to manage friend relationships, socializing problems, level of problem-solving skill, feelings of revenge are studied(Hayashibara,2017;König, Gollwitzer & Steffgen,2010)On the other hand, various characteristic of the internet such as its anonymity, speed, accessibility, pathological or excessive internet use are also under the scope of cyber bullying. According to many views cyber bullying is more common than traditional bullying and it causes negative consequences especially for cybervictims (Foody, Samara& Per Carlbring, 2015). Cyber bullying could lead negative emotions, depression, loneliness, suicidal tendency, decrease in academic achievement, isolation, anxiety and lowered self-esteem(Ho, Chen& Ng, 2017; Wright, 2017)sexual harassment and even death threats (Chan & Wong, 2015), Research conducted with 20 000 students, found that 15.8% of students were cyberbullied andvictim's distress was highest(Schneider, O'donnell, Stueve & Coulter, 2012). Especially for girls, cyber victimization has been strongly related to depression, which itself correlates to suicide attempts (Lee & Shin, 2017).

Cyber bullying adversely affects also family relationships and school environment as well as individuals. Davis (2017,96) defines cyber bullying as "social ill that has produced tragic consequences in schools".Cyber bullying may affect the school environment adversely as violence, conflict, absenteeism, decrease in course success, distortion in friend relationships, and failure to fulfill responsibilities. The school can turn into an environment to which both the source and the consequences of cyber bullying reflect. Students may use the



bullying in the cyber world as a mechanism of compensating their inability to manage their peer relationships and the conflicts and discussions they experience face to face. Academic problems (Tsitsika, et al.2015) conflicts in peer relations were associated with cyber victimization. A study conducted by König, Gollwitzer & Steffgen (2010) with 473 students show that traditionally bullied students tend to choose their former perpetrators as cybervictims. A student subjected to cyber bullying may create a sort of cyber bullying cycle by cyber bullying himself/herself(Chapin& Coleman, 2017). Students that become the target of cyber bullying may lose their interest in school, demonstrate a low academic success and experience depression (Stover, 2006). Compared to students not subjected to cyber bullying, these students have a higher absenteeism rate and lower grades points. Also, they cannot focus their attention on academic subjects and teachers. (Kowalski et al., 2008). The aggression experienced among students in cyber world can reflect on the class environment when they are face to face at school. Cyber victims can suffer physical and psychological damage, and educators can fail to intervene with this situation. Even, cyber bullies make negative comments about school administrators and teachers in the cyber world when at school(Davis,2017).Most of the time, a student subjected to cyber bullying shares it not with his/her family but friends, or cannot say anything at all.Rumors may start at school about knowing, or not knowing, the cyber bully-the victim and lead to discussions and conflicts resulting in disciplinary actions/administrative penalties. Measures taken in the school environment, school personnel's being knowledgeable and conscious are very important in terms of preventing the negative consequences of cyber bullying.

Family and school are regarded as the most important sources in preventing cyber bullying, as well as technical, psychological, social and cognitive interventions are recommended and implemented. These interventions:technicalweb-protection interventions such as blocking cyberbully, changing passwords, delating messages (Aricak et al., 2008) training of students as cybermentors-safety films for students, Parents monitoring, designing cybersafety resources for parents (Faccio, Iudici, Costa & Belloni, 2014), Online psychological therapy (Foody, Samara & Carlbring, 2015), cyber bullying professional development programs for schools(Hayashibara, 2017). Kings' (2014) research conducted with 39 secondary school counselors revealed that emerged themes as possible interventions aresmall group counseling, classroom guidance lessons, referrals to administration, Providing a safe school climate, creation of the core team, Digital citizenship education.As seen, information, training, resource preparation, policy creation and technical measures become prominent.Interventions focusing on psychological needs and skills development are also recommended. Trolley et al. (2009) also saw cyber bullying in the scope of psychological perspectives and recommend Psychological, Educational, Social Intervention Programme (PEAS) which includes looking at skills and abilities, such as communication, social, anger management, conflict resolution skills and enhanced friendship building opportunities. Creating preventive policies at school requires the cooperation, effective involvement and role-responsibility of families, teachers, school administrators, school personnel and all stakeholders.

Theoretical studies regarding cyber bullying emphasize the different aspects of the topic. According to Bandura's Social Cognitive Theory (1986, 1990, 1991), interacting with others guides the development of behavioral norms and moral standards."Moral disengagement and collective moral disengagement are concepts that can have an impact on whether or not the audience will intervene with cyber bullying(Cited by Allison & Bussey, 2017, 8). Barlett and Gentile Cyber bullying Model(BGCM)explains cyber bullying as a learned behavior which is learnt by observing actions. Positive attitudes toward cyber bullying and reinforcement of cyber bullying, predict subsequent cyber bullying behavior" (Barlett & Gentile, 2012). On the otherhand social psychological perspective claims that



individuals compensate their physical weaknesses by establishing superiority on others by cyber bullying. Being known as a cyber bully in anonymity creates a power parallelism/equality (Ybarra ve Micheeal, 2004). Similarly General Strain Theory claims that "Youth who are angry or frustrated are significantly more likely to cyberbully others. Youth

who experience strain are more likely to cyberbully others" (Patchin & Hinduja, 2011). In Turkey, it is officially regulated to appoint and assign a school psychological counselor at every school. Guidance services at schools are provided under the coordination of psychological counselors titled guidence teacher(Akar,2016). These services are the services of getting to know the student, psychological counseling, guiding and placement, orientation, information gathering, monitoring (directly); preparation of School Guidance program, research and evaluation, consulting, relationships with the environment, parentrelated services, and referral services (indirectly). Psychological counselors working at school guidance services are the professionals who face students and student problems most frequently and are referred for solutions. They are professionals working to achieve students' healthy development and self-realization. Therefore, psychological counselors are the richest resources in terms of cyber bullying incidents at schools, the investigation of cyber bullying and their opinions Although cyber bullying incidents are not common in Turkey, children and the youth are a main topic, as in the entire world, in terms of the risk of spreading cyber bullying with information technology-tools and high internet skills. When the studies conducted in Turkey are reviewed, similar findings are seen.Research conducted with 1002 high school students in İstanbul, revealed that duration of internet use of adolescents' increased over years and the age of meeting with the internet has significantly decreased (Akar,2017). A study conducted with 336 adolescents, found that 14 % of adolescents were victimized, 10% of the adolescents bullied others during the last one month in cyberspaces(Özdemir & Akar, 2011). In another research, 35.7% of high school students have cyber bullied, and 23.8% thereof have both cyber bullied and become a victim (Arıcak et. al., 2008). Dilmaç & Aydoğan (2010) According to the results of a research conducted on bullying and values with 300 high school students, 19% of the participants cyber bully, 56% thereof state that they are the victim of cyber bullying, and 44% thereof state that they disguise their identity in the cyber environment(Dilmac & Aydoğan, 2010). When we look at the research conducted in Turkey, Turkey has some similarities with other countries in terms of percentages and variables. Such fact suggests that cyber bullying must be addressed as a universal phenomenon. Purpose of the study is to determine the opinions of school counselors on causes, consequences dynamics behind cyber bullying and recommendations about schools' preventive policy about cyber bullying. For this purposes following research questions were saught to answers:

What are the types of harmful behaviours of students on internet ?

What are the causes of cyber bullying?

What are the consequences of cyber bullying?

What could be the possible interventions to prevent cyber bullying in schools?

Methods

In this research, qualitative method was used and designed as pheonmenological study. Phenomenological study describes the meaning for individuals of their lived experienced of a concept or phenomenon(Creswell, 2007,57). Data collected through the two focus group interviews with 15 senior public and private school psychological counselors from 12 different primary, secondary and high schools in Ankara Province. In selection of the school psychological counselors, seniority and expertness in profession were considered as two criterias. For this aim researcher cooperated with the Public Guidance & Research Center



which participants workin crises intervention counseling team. The data was collected through the semi-structured interview form which was developed by the researcher.Focus group interviews were tape recorded. Data were analyzed by the content analysis.Contentanalysis is identifying main categories that emerge as being relevant to the description of the phenomenon. During the analysis of data, tape recorded answers and discussions was coded. Than these codes down into main and subcategories.Demographic characteristics of the study group shown below in the Table 1.

Table 1

Partic	ipant Gender	Age	Status of school	Type of school Seniority		Education	Number of student	Number of teacher	Cyber bullying cases in one semester
P1	Female	46	Private	High school	10	Doctorate	190	60	10
P2	Male	43	Private	High school	14	Bachelor	243	25	3
P3	Female	30	Private	High school	1	Master degree	700	70	5
P4	Female	38	Private	Secondary school	15	Master degree	68	11	4
P5	Female	48	Private	High-Secondary	27	Master Degree	750	110	3
P6	Female	37	Private	High school	15	Master Degree	637	43	1
P7	Female	47	Public	High school	24	Bachelor	715	2	3
P8	Female	44	Public	High school	20	Bachelor	600	100	2
P9	Female	43	Public	High school	23	Bachelor	750	53	7
P10	Female	45	Public	High school	15	Bachelor	750	55	-
P11	Female	41	Public	Primary	10	Bachelor	525	34	-
P12	Male	39	Public	High school	14	Bachelor	610	46	3
P13	Female	51	Public	Guidance Center	18	Bachelor	280 schools		
P14	Female	39	Public	Guidance Center	8	Master Degree	280 schools		
P15	Female	43	Public	Guidance Center	15	Bachelor	280 schools		

Demographic Characteristics of the Study Group

Regarding the study group demographics as Table 1 shows, all participants(school psychological counselors) were aged between 30 and 51 and group's years of experience ranged from 1 to 24. As two counselors from the study group were male and 13 of them were female; six of them work at private, nine of them work at public schools and three of them work at the Guidance & Research Center as Counselors supervisors.Except one of them, all the participants from private sector has master/post graduate or Phd degree.

Findings

Findings are in four parts according to the research questions. The first question of the study is to identify the types of cyber bullying among students according to school psychological counselors' opinions. Table 2 provides the Counselors' Opinions on types of harmful behaviours of students on internet.

Table 2

Counselors' Opinionson Types of Harmful Behaviours of Students on Internet

Main Subcategories Category		(f)	Sample Quote		
		(1)	Sample Quote		
1. Flaming		18	When communicating over the		
Verbal aggression,	Making fervent speeches	12	internet, they swear at, insult and		
Taking a photograph, modifying and posting			fight with each other(P7,Female,47		
Nicknaming in social media			years old).		
2. Outing & Trickery		17			
Sharing humiliating	comments and photos	7	It starts with confiding in doily life		
Sharing private info	Sharing private information and secrets of others		then continues with fights over the		
Sharing opinions by conflict	becoming a party in the	3	secrets spread over the internet (P14, female, 39 years old)		
3. Impersonation		6			
Hacking others accounts		3	I ney can easily reach everyone by		
Masquerading		2	45 years old)		
Creating web sites, blogs against friends		1	45 years old)		
4. Exclusion		3	Children suffer cyber bullyingand		
Exclusion		3	cannot even tell their schoolteachers		
			about it. They are afraid of being excluded(P8, female, 44 years old)		
5. Surfing		2	We see cases as a result of the		
Surfing in an inapp	ropriate web sites	2	directions to websites with		
			inappropriate content (P13, Female,		
			51 years old)		

In Table 2, types of cyber bullying among students are grouped under Flaming(f=18), Outing & Trickery(f=17), Impersonation(f=6), Exclusion(f=3) and Surfing(f=2). The highest frequency is in the Flaming and Outing & Trickery main categories. The lowest frequency is in the impersonation main category. The sub-categories with the highest frequency are "Verbal aggression and making fervent messages" (f=12), "Sharinghumiliating comments and photos" (f=7), Sharing private information and secrets of others (f=7).

Findings regarding the causes of cyber bullying, which is the second question of the study are shown in Table 3.

Table 3

Counselors' Opinions on Causes of Cyber bullying

Main Subcategories	(f)	Samala Ovata
Category	(1)	Sample Quote
1. Psychological Problems	18	"It is an individual's effort to be a self,
Adolescent pathologists(psychiatric	5	exist, and say 'I am here; notice me"(P13,
problems)		Female, 51 years old)
Jealousy	3	"If he/she has low self-esteem and is
Negative peer relationships	3	physically weak, then he/she tends to use
Negative self-perception and self-image	2	the keyboard to compensate this
Notenough strong ego to cope with	2	gap"(P12, Male, 39 years old).
aggression		"There are also those who satisfy their
Inadequacy to handle with real life	2	revengeful feelings indirectly by means of
problems		the internet."(P9, Female,43 years old)
Being a victim of bullying before	1	
2.Social & Communication Skill Shortage	10	"Since they lack self-esteem, they say or
Lack of communication culture skills	5	do the things they can't in the real life by
Lack of social skills	5	means of the cyber World"
		(P13, Female, 51 yeas old)
3. Anonymity of Internet	10	"The major issue is that they think it is a
Uncontrolled communication	6	ruleless and unlimited, environment. They
opportunities in the cyberworld		can perceive it as unlimited,
Opportunity to hide the credentials	4	uncontrolledlike the wildlife"(P1,
		Female,46 years old)
4. Need to develop ethic norms for cyberspace	7	"Something I have experienced; A very
Ignorance of personal rights, border	3	good student of mine came up to me and
&privacy		said 'Is the whole World just thismachine?
The thought that the internet is	•	If it were, I'd throw it away and break it.
unbounded&uncontrolled	2	why would they care about this that
Lack of communication culture on	2	much? There are students who are aware
cyberworld		and students who aren t (P7,Female,47
5 Lack of Parantal Awaranass	5	The source of the problems we experience
J. Lack of Falendal Awareness	5	at school are correspondence, insult and
nadequate technical knowledge of	\mathbf{r}	contempt among the students At this stage
adolescent	2	the school and parent attitude further
Depends indifference and anothy	2	escalates the issue, let alone helping with
Parents' inadequate knowledge about	ے 1	it. I have seen that the schools experience
cyber bullying	1	less problems when parents are informed
cyber burrying		(P2, Male, 43 years old)
6. School climate	5	When the children do not have a suitable
Need to develop school climate which	2	environment and enough energy for social
support student's creativity		activities due to heavy class work, they
Intensive course schedule	2	resort to cyber communication
Need to increase social activities	1	(P8, Female, 44 years old).

When Table 3 is examined, the causes of cyber bullying collectedunder the six main categories of Psychological Problems(f=18), Social & Communication Skill Shortage(f=10), Anonymity of internet(f=10), Need to develop ethic norms for cyberspace (f=7), Lack of

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parental awareness(f=5) and School Climate (f=18). The sub-categories with the highest frequency in these main categories are "Uncontrolled communication opportunities in the cyberworld" (f=6), Adolescent pathologists (f=5), Lack of communication culture skills (f=5), Lack of social skills (f=5). The highest main category of causes of cyber bullying is Psychological problems.

Findings regarding the consequences of cyber bullying, which is also the the third questions of the study is shown below in the Table 4.

Table 4

Counselors' Opinions on Consequences of Cyber bullying

Main Subcategories		Commits Oracle		
Category		Sample Quote		
1. Psychological Problems				
Examining the trauma of an outbreak of the	3	"There is a major alienation issue		
privacy		(having instant relationships and		
Alienation to self, emotions and real world	2	consuming and destroying them		
Negative personality development	2	afterwards)"(P6, Female, 37 years old)		
Suicidal tendency	2			
Insensitivity	1			
Increased sense of worthlessness	1	"They are not aware that they are		
Introvert	1	cyber bullying, they have no clue		
Occurrence of cyber dependency	1	about it and act on vindictive		
Permanent psychological damage	1	reenings (P9, remaie, 43 years old)		
2.Problems in School Climate		"Student, isolation when the bully		
Threatening the safe environment of the school		appears, sorrow when the victim		
Spreading the subject between two people		appears, lack of confidence inschool		
Conflict, verbal - physical violence	2	environment"(P11,female,41years old)		
3. Reflections to the Family	10	"Addressing to the parent role again		
Deteriorationin family relationships		and focusing on teaching values		
The annoying attitudes of the family on children		would help.Family education is very		
Cause to helplessness and anger in the family	3	important during 0-6 age" (P7,		
		female, 47 years old)		
4. Academic problems		"I observe a decrease in the sense of		
Changing school		responsibility and in the success, an		
Absenteeism and low academic success	1	increase in attendance,		
Reduced sense of responsibility	1	insensitivity"(P7, Female, 47 years		
		old)		

When Table 4 is examined, the consequences of cyber bullying collected under the four main categories of Psychological Problems(f=14), Problems in School Climate (f=11), Reflections to the Family (f=10) and Academic problems (f=3). The main category with the highest frequency is "psychological problems". The main category with the lowest frequency is "Academic problems". The sub-categories with the highest frequency in these main categories are "Uncontrolled communication opportunities in the cyberworld" (f=6), "Threatening the safe environment of the school"(f=6), "Deterioration in family relationships" (f=4).

Findings regarding the recommendations of counselors' about preventing cyber bullying is shown below in the Table 5.

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Table 5

Counselors' Recommendations About Cyber bullying Preventive Policy in Schools

Main Subcategories	(f)	Sample Quota
Category	(1)	Sample Quote
1. Training and Informing about Cyber bullying	27	"There should be efforts to raise
(individual, institutional, societal level)	41	awareness in the society"(P6,
Informing about safe and ethic use of internet	7	Female, 37 years old)
Informing about the legal issues of cyber bullying	6	"Since it can feed from different
Make parents aware and conscious about cyber	5	fields, it should be also addressed
bullying		on legal, social and individual
Teaching the concepts of personal rights and	4	level.Knowledge of personal
responsibilities		rights, legal sanctions, information
Defining cyber communication:respect, rules	3	law must be taught,life skills and
Creating awareness and conscious in the society	2	problem-solving skills can be
		improved"(P12,male,39 years old)
2. Developing social & communication skills of	15	"Programs for development of
students		social skills and self-esteem: It
(Implementing psychological health programs in		would be helpful to improve real
schools)		life skills such as science, art and
Developing social skills of students (social	5	sports and increase opportunities
activities)		that provide emotionalsatisfaction"
Developing communication skills of students	4	(P12, male, 39 years old)
Creating a culture of communication in	3	"Activities can be organized for
Cyberworld		decision making, selecting,
Orientation, assertiveness trainings	2	applying what is selected and
Psychological Counseling (bully-victim-followers)	1	taking responsibility"
		(P13, female, 51 years old)
3. Change in School Culture (Supportive & safe	5	"Structured works in pre-school,
climate)		primary and secondary education
Cooperation of all teachers in the prevention of	1	can be conducted"(P10, Female,
cyber bullying		45 years old)
Getting a support of student social clubs	1	"It would be helpful to prepare an
Mediation trainings	1	action plan, increase arts, music,
Change in school culture (interfering cyber	1	sports activities at schools and to
bullying)		develop empathy skills at primary
Qualified school administrators	1	schools"(P10,female, 45 years old)

In response to the third research question, Table 5 shows that Counselors' recommendations about preventing cyber bullying in schools, collected under the three main categories which are Training and Informing about Cyber bullying (f= 27), Developing social & communication skills of students (f=15), Change in School Culture (f=7). School counselors consider "Informing about safe and ethic use of internet" (f=7), Informing about the legal issues of cyber bullying (f=6), Developing social skills of students (f=5), Make parents aware and conscious about cyber bullying(f=5) as a highest agreed recommendations to prevent cyber bullying.



Discussion

This study purposed to determine, types, causes and consequences of cyber bullying and recommendations to prevent cyber bullying in schools according to school psychological counselors opinions'. School psychological counselors think that cyber bullying incidence is low, but that measures are necessary since cyber communication problems may cause cyber bullying to spread. The most common cyber bullying type is "flaming" and "outing & trickery", and the least common is "surfing" and "exclusion". There are different types of cyber bullying coming to the forefront in the literature. A study conducted in Taiwan suggests that the most serious type of cyber bullying is "impersonation" (Chen & Cheng, 2017); while another study suggests that the most commonly observed type of cyber bullying is outing & trickery(Davis, 2017).

In this study, according to school counselors opinions causes of cyber bullying are "Psychological Problems", "Social & Communication Skill Shortage of the students", "Anonymity of internet", "Need to develop ethic norms for cyberspace", "Lack of parental awareness" and "Supportive & safe school climate". Psychological factors are also seen to be very important.A research conducted by King (2014) again on counselors found the psychological impact as the emerging theme. Under the psychological factors, students' need of self-realization, low self-efficacy, negative self-perception, problematic peer relationships are observed to be the important topics. Other causes for cyber bullying revealed in the present study are "the need to develop social and communication skills" and "regulation in the system of principles and values". A study conducted on the Spanish adolescents suggests that adolescent perception of cyber bullying is the need to improve self-confidence, adaptive behavior and assertiveness skills and to normalize their anti-social behavior(Cuadrado-Gordillo & Fernández-Antelo, 2016). Hoff and Mitchell (2009) on the other hand, suggested that cyber bullying was caused by "relationship problems". Their behavioral and mental health problems(El Asam & Samara, 2017) self-regulation skills should be developed Hayashibara(2017). Increasing activities that can improve students' social and communication skills in real life may help them to achieve satisfaction and regulate their human relationships in real life. Further, ethical norms such as adhering in cyber word to principles of interpersonal relationships in real life as well, showing respect and kindness and not distorting information must be internalized. Allison & Bussey (2017) found in his/her research that oral standards were one of the important variables in cyber bullying. This also brings about the concept of cyber` balance. When cyber bullying is considered together with another main category, "anonymity", it may be suggested that adolescents need to learn about the differences between the real life and cyber life, and improve their knowledge and skills to achieve this balance.

Psychological Problems, Problems in School Climate, Reflections to the Family, Academic problems are main consequences of cyber bullying according to school counselors. Cyber bullying causes psychological problems in victims in particular such as depression, introversion, alienation from self and the outside world; and may result in desperation within the family, hopelessness, worn-out relationships, becoming more sensitive toward children. Although few, cyber bullying incidents affect the school climate adversely such as conflict, not feeling safe at school, creating supporters; and lead to academic problems such as absenteeism, low academic success, alienation from responsibilities. The findings of the King's (2014) research support the findings of this study as well and suggests that cyber bullying affects the school climate adversely. Cyber bullying particularly damages "social well-being" strongly, causes problems at school such as dissonance and absenteeism(Hoff & Mitchell, 2009); and leads to serious results such as low academic success, anxiety, and sometimes suicide (Foody, Samara & Carlbring,2015).



According to school counselors' opinion, in order to prevent cyber bullying, some interventions should be taken into consideration and policies should be developed on individual, societal and school (institutional) level. These recommendations are grouped under some main categories such as "Training and Informing about Cyber bullying", "Change in School Culture". "Developing social & communication skills of students". Similar studies also support this finding (Watts, Wagner, Velasquez & Behrens,2017). Davis' (2017) study, too, described the main themes as the description of cyber bullying, improvement of knowledge, skills and competences of professionals in the matter and development of preventive policies. While creating policies, especially families must be conscious and actively involved(El Asam & Samara, 2017; Faccio, Iudici, Costa & Belloni, 2014). A negative relationship was found between the family intervention and cyber bullying (Ho, Chen, & Ng, 2017). A family's strong, positive bond with the child can be preventive. The study by Ang (2015) also recommends that family relationships of adolescents with weak emotional and relational attachment with the family must be systematically studied.

According to thisstudy's findings, a supportive and safe school environment is helpful to prevent cyber bullying incidents. It is suggested that cooperation with teachers, raising awareness in educational personnel, and a school climate where the measures to take against cyber bullying incidents are determined and that develops positive friend relationships, social activities and provides psychological increases support prove to be preventive(Hayashibara,2017; Robinson, 2010; Noah,2012). King (2014) also stresses that a safe climate must be created where "students suffering cyber bullying" can speak without fear while Gámez Guadix & Gini, (2016) stresses the importance of working with in-class peer groups and that a special attention must be given to those who are at the beginning of adolescence. In this respect, school administrators have an important role of learning about cyber bullying and transforming school culture by developing policies.

Another main category recommended to prevent cyber bullying is the "development of social skills and communication skills". Psychological counselors approach cyber bullying as a pathological condition that is combined with inability to manage friend relationships lack of social skills and the perception of infiniteness of the Internet. From such point, it is suggested that the more adolescents develop their social skills and communication skills in real life with psychological counseling, the more they can improve their emotional satisfaction and their self-efficacy. Increasing social club activities at schools will contribute development of social skills. healthy friend to the and and human relationships(Robinson, 2010; Monks, Mahdavi & Rix, 2016). King's(2014) study also indicate that empathy training, conflict resolution, problem-solving, friendship skills, coping skills were benefitial to prevent anticyber bullying programms. In the present study, school counselors consider separate psychological counseling with victims, bullies and the audience as a preventive school intervention. Psychological counseling is another intervention recommended as a school practice in cyber bullying cases(King, 2014). For, psychological factors and tendency to create a self and achieve satisfaction in cyber world are important in cyber bullying. At the same time, it may be suggested as helpful to increase school activities aimed to develop social and communication skills as well as academic success.

Conclusions

Cyber bullying is observed to have common main categories that reflect to both its causes and consequences. These categories are "psychological problems", "development of social and communication skills", "internalization of cyber ethical principles", "information and awareness"", and "safe supportive school climate". It is stressed in particular to "conduct studies/works aimed to understand the difference between real life and cyber life", "satisfy the need of self-realization in real life", and "create the rules for cyber communication".


Psychological factors appear under both the topic of causes and the main category of "consequences". Information and raising awareness constitute both the cause of cyber bullying and the main category recommended to prevent cyber bullying. Therefore, programs for preventing cyber bullying, healthy psycho-social development conditions under the scope of school mental health must be created; works aimed to raise awareness on individual, social and institutional level must be conducted; and a holistic understanding requiring the cooperation of families and all educators that protect the real life-cyber life balance must be planned and implemented. There also appears to a need to develop a model that involves a multi-dimensional and interdisciplinary cooperation in the field to prevent cyber bullying. For, there is a multi-dimensional structure that involves all of the fields including psychology, sociology, cyber Safety, management, information and communication.

Implications

The future studies may focus separately on the cause, consequence and recommendation main categories suggested in the present study on the cyber bully, cyber victim, audience, preventing individuals (student, prevent, teacher, school administrator, school psychological counselor), and institutions (schools, media, non-governmental organizations, health-care organizations, educational institutions, academia) levels. In this respect, dynamics of increasing individual, institutional and social awareness may be explored. Also, cyber bullying concerns educators and scientists in all countries as a universal problem. Conducting multinational research and similar studies particularly with the participation of IT professionals will also make a meaningful scientific contribution.

SHORT BIOGRAPHY

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Candidate Teachers' Cognitive Constructs Related to Ideal Lecturer Qualifications: A Case Study Based on Repertory Grid Technique

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Abstract

In this study, it was aimed to reveal candidate teachers' cognitive constructs related to the ideal lecturers' qualifications. The study was conducted based on case study design which is one of the qualitative research patterns. The study group was 21 candidate teachers. The study group was determined by using criterion sampling method. Data were collected via a repertory grid technique. The candidate teachers have produced 210 valid cognitive constructs related to ideal lecturers' qualifications. The most frequently mentioned cognitive constructs are namely, (1) communication skills [η =11, 5.2%], (2) professional competence $[\eta=9, 4.3\%]$, (3) acknowledged expert $[\eta=8, 3.8\%]$, (4) motivation skills $[\eta=7, 3.3\%]$, (5) good humoured [η =7, 3.3%], (6) treating fairly [η =6, 2.8%], (7) respectful to different opinions [n=5, 2.4%], (8) innovative/inventive [n=5, 2.4%], (9) academically/scientifically accoutred $[\eta=4, 1.9\%]$, and (10) classroom management skills $[\eta=4, 1.9\%]$. The 210 cognitive constructs were collected in eight different cognition groups considering functionality and the similarities. The main cognition groups are (i) personal qualifications $[\eta=19, f=54]$, (*ii*) academic efficacy $[\eta=20, f=31]$, (*iii*) professional competency $[\eta=16, f=28]$, (*iv*) communication skills $[\eta = 17, f=25]$, (*v*) student centeredness $[\eta=15, f=21]$, (*vi*) motivation $[\eta=15, f=20]$, (vii) professional ethics [n=11, f=17], and (viii) democratic attitude [η=10, f=14].

Keywords: candidate teacher, ideal lecturer, qualifications, repertory grid **Main Conference Topic:** Educational Management

Introduction

Ideal lecturers' qualifications are particularly under close scrutiny owing to raise the teaching and learning quality, and therefore faculty effectiveness. Academically qualified lecturers have a critical role to ensure successful learning experiences and the qualifications of job requirements for all students which they need. Therefore, the defining attempts of lecturers' knowledge, skills and abilities ensure to review their performance and support them to continue professional improvement.

There are basically two indicators determining development level of the societies. One of these is per capita income and the other is qualified human power. The central activity of higher education is to maximize the student's educational development, and therefore it should be focused on the academic staffs' qualifications in higher education (Tam, 2010). The growth of human power can be realized with the presence of qualified lecturers who are well equipped, open to the horizon, high knowledge, and open to change and development (Higher Education Institution [YOK], 2011).

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The qualification term is defined as the ability, competence, effectiveness or perfection. It is also identified as the knowledge, skills and competencies which agreed upon within a certain period (Tuck, 2007). Qualification is defined as the job requirements such as the knowledge, aptitudes and skills required to perform the specific tasks attached to a particular work position (ILO, 1998). A qualification confers official recognition of the value of learning outcomes in the labour market and in education and training. A qualification can be a legal entitlement to practice a trade (OECD, 2007). On the one hand, the quality term is used to express entirety of knowledge, skills and abilities on the other hand in business life it is seen as the entirety of characteristics which are necessary to fulfil a business task, successfully (Karadag, 2011).

Ideal lecturers' qualifications are the characteristics can be measured according to a standard (Schonwetter, 1993). In this view, the preparation of teachers in college or university teacher education programs, and government certification standards, all too often lack adequate rigor, breadth and depth, resulting in high levels of underqualified lecturers and low student performance (Ingersoll, 2007). Therefore, the professional knowledge, skills, and dispositions of lecturers should be grounded in what their undergraduates will need to know and be able to do in order to contribute meaningfully to life in a democratic society (AAPT, 2009). There is however, no single formula for giving effective lectures, and there is no single 'right way' to give lectures that are high quality learning experiences for students (Voss, & Gruber, 2006). First of all, the lecturers should be full of the love and they like their professions and students. The fundamental of this love should base on respects to their individual characteristics, professions and students (Gencturk, Akbas, & Kaymakcı, 2012). Higher education is nowadays seen as the business-like enterprise, where the students as a consumer seeks a business-like relationship with the lecturer that delivers knowledge, skills, attitudes and competencies he or she needs (Newton, 2002).

Related work

Due to its critical importance in higher education institutions, the lecturers' teaching quality is seen an important issue for educators, policymakers, practitioners and researchers (Roth, & Swail, 2000). Two paradigms are preferred related to the researches on teaching qualifications. The first, which has been characterized as the process-product research accounts for the majority of the studies. In these studies, the effective teaching is sought by correlating with particular processes, or teacher behaviours related to particular products usually defined as the student achievements are explored by researchers using standardized tests (e.g. Darling-Hammond, 1992, 2000; Kennedy, 1991; Liakopoulou, 2011; Wright, Horn, & Sanders, 1997). The second paradigm includes the diverse groups of qualitative or interpretive studies that provide detailed descriptive accounts by considering participants' cognitive constructs related to the effective teaching (e.g. Cochran-Smith, & Lytle, 1993; Telford, & Masson, 2005; Voss, & Gruber, 2006). In general, in such kind of studies the teaching qualifications is discussed in the context of emotional and social quality. Due to being insufficient alone of the rational thought and logical processes, the studies focusing on the ideal teachers' qualifications (e.g. Ciltas, & Akilli, 2011; Darling-Hammond, 2010; Devlin, 2010; Milanowski, 2004; Rivkin, Hanushek, & Kain, 2005) are gained more importance.

In many previous studies, it was benefitted from the constructivist theories such as radical constructivism and social constructivism (e.g. Butt, 2007; Fransella, 2006; Raskin,

2006; Warren, 2004), as well as to different philosophical theories, mainly phenomenology (e.g. Apelgren, 2001, 2003; Butt, 1997, 2003, 2004; Warren, 1998) trying to explain how the people think. Therefore, the current study was conducted based on '*Personal Construction Theory*' which developed by Kelly in 1955. The Personal Construction Theory is a personal constructivist theory aiming to explain the individual's beliefs and world view by his/her 'personal constructs' in cognitive dimensions formed by two opposite poles (Dalton, & Gavin, 1992). The repertory of an individual's constructs and the relationship between these constructs provides a basis for predicting individual's beliefs and judgments (Greyling, & Lingard, 2015; Paszkowska-Rogacz, & Kabzińska, 2012). Over the years, 'Kelly's Personal Construction Theory' was thoroughly revised and developed, and it has also been successfully applied to many fields of research and practice (Pervin, & John, 2002).

The basic starting point of the Personal Construction Theory is cognitive structure. Cognitive structure is characterized as a mental state that it is achieved in consequence of several cognitive process (Cuceloglu, 1991, p.201). The cognitive process in a sense is deeply rooted in the individual's interactions with the milieu. The cognition creation process is a conscious process of individual's mind, including different aspects such as awareness, perception, reasoning, and judgment (Wilson, 2002). Cognitive structure system embraces the total network of a person's constructs, and it includes tacit as well as verbal constructs (Bussis, Chittenden, Amarel, & Klausner, 1985). Therefore, it has been accepted that the personal constructs are individually created and structured. Lecturers' professional attitudes and behaviours can be evaluated as the most important factors that shape candidate teachers' cognitive structures related to the ideal lecturers' qualifications. In this context, this study focuses on revealing the candidate teachers' cognitive constructs stored in their mind as the 'ideal lecturer qualifications'. For this purpose the answer was sought following question *what are the candidate teachers' cognitive constructs related to the ideal lecturers' qualifications?*

Methodology

This study was conducted in a case study design, which is a qualitative research method. Qualitative research designs are used to obtain comprehensive knowledge about a topic (Denzin, & Lincoln, 2005; Marshall, & Rossman, 2006; Patton, 2014; Singh, 2007). The case study allows an investigation to retain the holistic and meaningful characteristics of real-life events, and this method enables researchers to closely examine data within a specific context (Fidel, 1984; Yin, 2003; Zainal, 2007).

Study Group

The study group consisted of 21 candidate teachers. The participants were determined by using the homogenous sampling method. Homogenous sampling involves selecting similar cases to further investigate a particular phenomenon or subgroup of interest. To describe a particular subgroup in depth, to reduce variation, simplify analysis and facilitate group interviewing (Paliknas et al., 2015; Teddie, & Yu, 2007). The participants were 12 female (57.1%) and 9 male (42.9%) candidate teachers. They were pre-school candidate teachers. The average age was 21.3.

Research Instrument and Procedures

The study was conducted in four stages: (*i*) definition of the problem, (*ii*) preparation of the data collection instrument, (*iii*) data collection, and (*iv*) data analysis and interpretation (Mayring, 2011).

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(*i*) *Definition of the problem:* In the first stage, the problem was defined. Then, a conceptual framework was created to be able to classify and compare the ideal lecturers' qualifications examined in current study.

(ii) *Preparation of the data collection instrument*: In this phase data collection tool was prepared. Data was obtained by using "triad repertory grid" technique (Adams-Webber, 1996; Jankowicz, 2004; Bell, 2005).

The repertory grid form used in study is given in Figure 1.

Lecturers							
Cognitive Constructs		Ideal		Non-ideal			
Ideal qualifications	Halime	Füsun	Nuran	Şeyma	Tacettin	Afife	Non-ideal qualifications
	Δ		Δ	Δ			
		Δ			Δ	Δ	

Figure 1. The triad repertory grid form

• Imagine that the two lecturers in each trio display same qualification in a similar manner but third is different.

• Write your answer as two words, two parts of sentence or two identifications which separated by dashes (-).

• The figure has been named as similar pole (ideal) that two lecturers' qualifications are similar.

• The figure has been named as averseness pole (non-ideal) that two lecturers' qualifications are different from the third lecturer.

(iii) *Data collection:* In repertory grid technique, the data is obtained based on different stages (Adams-Webber, 1996; Fransella, Bell, & Bannister, 2004). *Firstly*, it was asked from the candidate teachers they should think about three lecturers displaying ideal characteristics and then the three lecturers displaying non-ideal characteristics. *Secondly*, it was asked from the participants that they should place three ideal lecturers in sections of grid form using code names. In the same way, it was asked from participants that they should place three non-ideal teachers using code names. *In the third stage*, it was asked from each participant that they should specify ideal qualifications according to the importance level and so ten two-dimensional cognitive constructs were obtained. *In the fourth stage*, the cognitive constructs were scored by each participant among 1-6 points on the repertory grid form. Each interview has lasted about 20 minutes.

As an example a grid form completed by a candidate teacher given in Figure 2.

Lecturers							
Cognitive Constructs	Ideal		Non-ideal				
Ideal qualifications	Halime	Füsun	Nuran	Şeyma	Tacettin	Afife	Non-ideal qualifications
Good-humoured	4∆	6	4∆	2∆	1	1	Domineeringness
Acknowledged expert	5	6Δ	5	3	2Δ	2Δ	Disrespectful to diversity
Respectful for diversity	4	6	4	3	2	2	Comparing with peer

Figure 2. The repertory grid form completed by a candidate teacher



(iv) *Data analysis and interpretation:* Data was analysed by using the descriptive analysis method. This method includes four stages namely, characterising constructs, identifying core constructs, assessing relationships, and analysing data (Jankowicz, 2004). *In the first stage*, a total of 210 cognitive constructs were characterised related to ideal lecturer qualifications. *In the second stage*, the cognitive constructs were classified into groups considering similar qualifications. *In the third stage*, ideal cognitive constructs were grouped, in a way that any construct left out. *In the fourth stage*, the scores were added and the first produced cognitive construct score was multiplied by '10', the last cognitive construct score was multiplied by '1' and thereby the relative importance scores were obtained.

Interpretation of findings was carried out in seven stages namely, (i) *counting step*: this stage includes the separation of data to cognitive constructs groups and determining frequencies (ii) *sampling step*: this stage includes the notation of the examples or issues occurred as a result of repetitions (iii) *classification of similarities*: this stage includes separation to groups of cognitive constructs with similar characteristics (iv) *categorisation*: this stage is includes grouping of variables in accordance with the purpose of the study (v) *association of variables*: this stage includes the identification of relationships between variables (vi) *establishment of cause-effect relationships*: this stage includes the establishment a connection between variables, and (vii) *association of data with the research's theory*: this stage includes the explanation the reasons of specific data occurrence and general suggestions.

Results

The results show that the candidate teachers have produced 210 valid cognitive constructs related to ideal lecturer qualifications. The most frequently mentioned cognitive constructs are namely, (1) communication skills [η =11, 5.2%], (2) professional competence [η =9, 4.3%], (3) acknowledged expert [η =8, 3.8%], (4) motivation skills [η =7, 3.3%], (5) good humoured [η =7, 3.3%], (6) treating fairly [η =6, 2.8%], (7) respectful different opinions [η =5, 2.4%], (8) innovative/inventive [η =5, 2.4%], (9) academically/scientifically accoutred [η =4, 1.9%], and (10) classroom management [η =4, 1.9%]. The cognitive constructs were analysed and then similar constructs were classified. As a result of classification, eight main construct groups were determined according to the 210 valid cognitive constructs.

Results of cognitive constructs are given in Table 1.

	(I) PERSONAL QUALIFICATIONS (n=19, f=54)
Versatility [3] 210	• Innovative [20] 126	• Inventive [9] 66
Solution-focused [14] 210	• Dynamism [6] 120	Responsible [2] 63
• Idealist [20] 210	• Positive [8] 120	• Consistent [3] 63
• Dynamism [4] 207	• Tolerant [12] 120	• Consistent [20] 63
• Innovative [9] 198	• Wisecracking [15] 120	• Visionary [21] 54
• Helpful [21] 198	• Openness to criticism [21] 119	• Visionary [1] 46
• Dynamism [8] 189	• Faithful [11] 110	• Thoughtful [4] 46
• Trustworthy [10] 189	 Principled [21] 110 	• Have peace of mind [15] 44
• Openness to criticism [9] 168	• Neat [9] 105	• Tolerant [14] 42
• Consistent [10] 168	•Calmness [16] 105	• Thoughtful [19] 38
• Work planned [12] 168	• Responsible [1] 92	• Inventive [10] 23
• Humanist [20] 161	• Work planned [13] 92	• Modest [18] 22
• Tolerant [19] 154	• Modern [9] 84	• Self-audit [1] 21
• Prudent [1] 147	• Vision [3] 76	• Idealist [2] 21
• Participative [4] 147	• Vivacious [8] 76	Thoughtful [11] 21
• Objective [8] 144	• Innovative [21] 76	• Consistent [7] 18
• Dynamism [1] 126	• Idealist [4] 69	• Trustworthy [8] 18

Table 1: Results of cognitive constructs

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• Objective [10] 126	• Principled [20] 68	• Solution-focused [20] 18
(II)	ACADEMIC EFFICACY (n=20, f=	31)
Acknowledged expert [2] 240	• Learnedness [12] 200	• Self-proclaimed expert [14] 115
Acknowledged expert [5] 240	• Equipped in the field [19] 198	• Researcher [20] 115
• Acknowledged expert [6] 230	• Academically accoutred [8] 180	• Scientifically accoutred [10] 105
• Researcher [9] 220	• Scientific perspective [9] 176	• Self-enhancing [10] 92
• Acknowledged expert [1] 210	• Acknowledged expert [3] 168	• Proficiency in the field [21] 60
• Acknowledged expert [4] 210	• Acknowledged expert [17] 168	• Self-renewal [11] 42
• Researcher [11] 210	• Scientifically accouted [11] 147	• Academically effectiveness [5] 40
• Self-improvement [15] 210	• Knowledge on own held [16] 132	Academically effective [20] 40
• Self-renewal [6] 207	• Academic competence [16] 152 • Researcher [2] 126	Academic preside [17] 21 Academically accouted [21] 18
Acknowledged expert [7] 207	• Researcher [2] 120	• Academically accounce [21] 18
(III)	PROFESSIONAL COMPETENCY (n=1	16, f=28)
Professional competence [16] 210	Professional competence [3] 133	• Student centred teaching [6] 60
Orientation ability [20] 207	• Orientation ability [3] 105	Classroom management skills [7] 51
Professional competence [15] 198	• Orientation ability [11] 88	• Effective method [15] 51
• Using technology [2] 192	• Familiarization to learner [16] 88	• Use technology [9] 48
• Professional competence [1] 184	 Classroom management skills [5] 84 	Professional competence [18] 48
• Professional competence [5] 184	• Engaged learning [7] 84	• Role-model [3] 42
• Application skill [16] 168	• Teaching skill [15] 84	• Professional competence [17] 42
• Professional competence [14] 160	• Professional competence [19] 63	• Classroom management skills [12] 21
• Classroom management skills [6] 147	• Concentration [12] 60	• Calling with student's name [19] 21
• Effective teaching [12] 140	COMMUNICATION SKILLS (p=17	f-25)
Communication skills [10] 220	•Communication skills [14] 147	• Eloquence [6] 8/
Communication skills [11] 220	• Sincerity [15] 147	• Social skills [11] 66
• Good-humoured [10] 210	• Good-humoured [5] 144	• Good-humoured [13] 57
• Communication skills [15] 210	•Communication skills [3] 126	• Communication skills [2] 46
• Communication skills [17] 210	• Behave loosely [8] 126	• Communication skills [10] 46
• Good-humoured [21] 210	• Communication skills [7] 114	• Communication skills [12] 42
• Good-humoured [15] 184	• Speech [17] 110	• Good-humoured [16] 42
• Good-humoured [7] 180	• Social skills [2] 84	•Communication skills [9] 25
• Sincerity [17] 154		
(V)	STUDENT CENTEREDNESS (n=15,	f=21)
• Respectful to students [1] 207	• Considering students precious [4] 138	• Makes students feel good [5] 69
• Student centeredness [4] 184	• Respectful to students [13] 132	• Makes students feel good [14] 63
• Sensitive to students' problems [6] 184	• Student centeredness [21] 126	• Facilitator for students [16] 60
Facilitator for students [11] 184 Student contempones [12] 179	• Benaving sympathetically [17] 120	• Allocating time for students [6] 40
• Student centeredness [12] 176	• Pacification for students [16] 115 • Pahaving sympathetically [10] 100	Anocating time for students [7] 42 Paspactful to students [3] 21
• Empathising to students [13] 140	• Behaving sympathetically [19] 100	• Dealing with students [16] 21
	(VI) MOTIVATION (n=15, f=20)	• Dealing with students [10] 21
• Giving positive energy [3] 189	• Motivation skills [9] 132	• Making the course interesting [4] 92
 Motivation skills [17] 189 	 Motivation skills [14] 126 	 Motivates students [19] 76
• Keeping an interesting lecture [14] 180	• Motivates [4] 115	• Keeping an interesting lecture [17] 72
• Motivates [16] 180	• Giving positive energy [1] 105	• Motivates [18] 66
• Keeping an interesting lecture [13] 176	• Motivation skills [2] 105	• Keeping an interesting lecture [1] 63
• Motivation skills [5] 168	• Motivation skills [15] 105	• Keeping an interesting lecture [15] 21
• Motivating to success [20] 168	• Motivation skills [7] 100 PROFESSIONAL ETHICS (n=11 f	-17)
• Using time as efficient [18] 220	• Treating fairly [19] 114	• Treating fairly [8] 40
• Treating fairly [5] 216	• Entering class on time [13] 105	• Using time as efficient [13] 36
• Entering class on time [18] 168	• Using time as efficient [12] 100	• Preparing for the lesson [6] 20
• Treating fairly [21] 168	•Entering class on time [14] 84	• Fair assessment [13] 20
• Entering class on time [19] 157	• Fair assessment [12] 80	• Treating fairly [14] 17
• Preparing for the lesson [11] 132	• Treating fairly [17] 63	
(VIII)	DEMOCRATIC ATTITUDE (n=10,	f=14)
• Loyalty to equity principle [18] 198	• Keeps principle of equality [7] 154	• Respect for human rights [8] 69
• Respectful different opinions [13] 189	• Respectful different opinions [2] 147	• Respectful for diversity [10] 69
• Respectful different opinions [16] 176	• Displaying democratic attitude [5] 115	• Displaying democratic attitude [4] 23
• Respectful for diversity [7] 168	• Equalitarian attitude [6] 100	• Respectful different opinions [5] 20
• Democratic attitude [10] 161	• Respectful different opinions [8] 100	

In Table 1, eight main cognition groups are seen. The main construct groups and dominant cognitive constructs are as follows:

- *Personal qualifications:* This group consists of 54 cognitive constructs. According to relatively importance level the three dominant cognitive constructs are namely, (1) *versatility* [3, 210], (2) *solution-focused* [14, 210], and (3) *idealist* [20, 210].
- Academic efficacy: This group consists of 31 cognitive constructs. According to relatively importance level the three dominant cognitive constructs are namely, (1) acknowledged expert [2, 240], (2) acknowledged expert [5, 240], and (3) acknowledged expert [6, 230].
- *Professional competency:* This group consists of 28 cognitive constructs. According to relatively importance level the three dominant cognitive constructs are namely, (1) *professional competence* [16, 210], (2) *orientation ability* [20, 207], and (3) *professional competence* [15, 198].
- Communication skills: This group consists of 25 cognitive constructs. According to relatively importance level the three dominant cognitive constructs are namely, (1) communication skills [19, 220], (2) communication skills [11, 216], and (3) good humoured [10, 210].
- Student-centeredness: This group consists of 21 cognitive constructs. According to relatively importance level the three dominant cognitive constructs are namely, (1) respectful to students [1, 207], (2) student-centeredness [4, 184], and (3) sensitive to students' problems [6, 184].
- *Motivation:* This group consists of 20 cognitive constructs. According to relatively importance level the three dominant cognitive constructs are namely, (1) giving positive energy [3, 189], (2) motivation skills [17, 189], and (3) keeping an interesting lecture [14, 180].
- *Professional ethics:* This group consists of 17 cognitive constructs. According to relatively importance level the three dominant cognitive constructs are namely, (1) *using time as efficient* [18, 220], (2) *treating fairly* [5, 216], and (3) *entering class on time* [18, 168].
- *Democratic attitude:* This group consists of 14 cognitive constructs. According to relatively importance level the three dominant cognitive constructs are namely, (1) *loyalty to equity principle* [18, 198], (2) *respectful different opinions* [13, 189], and (3) *respectful different opinions* [16, 176].

The candidate teachers' cognitive constructs related to ideal lecturers' qualifications were classified in eight different groups. Some participants have produced more than one cognitive construct in the same group. These repeats were assumed as only one construct.

The frequencies and percentages of participants in each cognitive construct group are given in Table 2.

Construct groups	η	%	Diagram
1. Academic efficacy	20	16.3	20.0 -16.3 -15.4
2. Personal qualifications	19	15.4	15.0 13.4 13.8 13.0 12.2 12.2
3. Communication skills	17	13.8	10.0 8.9 8.2
4. Professional competency	16	13.0	5.0
5. Student centeredness	15	12.2	0.0
6. Motivation	15	12.2	mic. mat. mic. one sent. non one shic.
7. Professional ethics	11	8.9	Neader Perse annu sessi sur aive acessi moor
8. Democratic attitude	10	8.2	is Co She She She De

Table 2: The participants' number in cognitive construct groups

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According to Table 2, the first three construct groups are namely, academic efficacy $[\eta=20, 16.3\%]$, personal qualifications $[\eta=19, 15.4\%]$, and communication skills $[\eta=17, 13.8\%]$. Besides, the last three cognitive construct groups are respectively, democratic attitude $[\eta=10, 8.2\%]$ professional ethics $[\eta=11, 8.9\%]$, and motivation $[\eta=15, 12.2\%]$.

The relative importance level of cognitive constructs was obtained according to the sums. The sums were procured by multiplying each cognitive construct's score with descending numbers, respectively "from 10 to 1". The results are given in Table 3.

Undergraduates	1-Personal Qualifications	2 -Academic Efficacy	3 -Professional Competency	4-Communication Skills	5-Student Centeredness	6-PMotivation	7-Professional Ethics	8-Democratic Attitude
1	432	210	184		207	168		
2	84	573	192	130		105		147
3	349	168	280	126	21	189		
4	469	210			322	207		23
5		280	268	144	69	168	216	135
6	120	437	207	84	230		20	100
7	18	207	135	294	42	100		322
8	547	180		126			40	169
9	621	396	48	25		132		
10	506	197		256				230
11	131	399	88	282	184		132	
12	288	200	221	42	178		180	
13	92	210		57	272	176	161	189
14	252	115	160	147	63	306	101	
15	164		333	541		126		
16	105	132	466	42	81	180		176
17		189	42	474	120	261	63	
18	22	132	48		364	66	388	198
19	192	198	84	220	100	76	271	
20	646	155	207			168		
21	557	78		210	126		168	
Total	5.595	4.666	2.963	3.300	2.379	2.428	1.740	1.689
Average	294.5	233.3	185.2	194.1	158.6	161.9	158.2	168.9

Table 3: The relative importance level of cognitive constructs groups



In Table 3, the data were analysed in two different ways. Firstly, the relative importance scores of each candidate teacher's cognitive constructs were analysed and given on each line. Secondly, the construct groups were given in grey on each line considering as the main construct group for each candidate teacher. The cognitive constructs' relative importance level is considered the first three cognitive construct groups ensued as follows: (1) personal qualifications [η =9, 42.8%], (2) academic efficacy [η =4, 19%], and (3) communication skills [η =2, 9.5%]. Besides, the two main cognitive constructs were produced in professional ethics by candidate teachers. On the other hand, at least one main cognitive construct was produced in every construct group by candidate teachers.

In Table 3, total and average scores in the last two lines represent the relative importance level of each cognitive construct group. According to the total scores the first three cognitive construct groups ensue as follows: (1) *personal qualifications* [total=5595], (2) *academic efficacy* [total=4666], and (3) *communication skills* [total=3300]. When the average scores are considered the first three cognitive construct groups are similar and come in sight as follows: (1) *personal qualifications* [\overline{x} =294.5], (2) *academic efficacy* [\overline{x} =233.3], and (3) *communication skills* [\overline{x} =194.1].

Conclusion

The present study aimed to explore in detail candidate teachers' cognitive constructs related to ideal lecturers' qualifications. For this purpose, a qualitative research was conducted on 21 candidate teachers based on repertory grid technique. The 210 cognitive constructs were produced by candidate teachers and these constructs were collected in eight main construct groups considering functionality and similarities. These main construct groups are namely, (1) personal qualifications, (2) academic efficacy, (3) professional competency, (4) communication skills, (5) student centeredness, (6) motivation, (7) professional ethics, and (8) democratic attitude. The results show that candidate teachers give extra importance personal qualifications of lecturers. Additionally, the academic efficacy and professional competency are seen as the primary ideal qualifications of lecturers by the candidate teachers.

Candidate teachers produced multi-dimensional cognitive constructs related to ideal lecturers' qualifications. Kelly (2003), states that as a result of individual's interaction with external environment each new knowledge changes the individuals' mind mapping, and thus their cognitive structures are reshaped. Therefore, it is understood that the multi-dimensional cognitive constructs of candidate teachers are rooted the interaction from external environment. According to Hampson (2001), the cognitive constructs are also associated with an individual's experiences. The other cause of this multidimensionality is experiences of the candidate teachers in faculty environment. Consequently, it can said that the candidate teachers' cognitive constructs were shaped based on different factors.

The results show that some cognitive constructs are repeated frequently. These cognitive constructs are respectively, (1) communication skills, (2) professional competence, (3) acknowledged expert, (4) motivation skills, (5) good humoured, (6) treating fairly, (7) respectful to different opinions, (8) innovative/inventive, (9) academically/scientifically accoutred, and (10) classroom management skills. These results are in substantial agreement with previous studies conducted by Brown, & Atkins (2002), Chepchieng, Mbugua, & Kariuki (2006), Darling-Hammond (2000), Douglas, & Douglas (2006), and Voss, & Gruber (2006). Therefore, it can be said that the candidate teachers have produced the similar cognitive constructs with the qualifications in previous studies and related literature. In the



light of data it is suggested that an ideal lecturer should be acknowledged expert, respectful to the different opinions, fair; and should have professional competence, motivation skills, good humoured, innovative/inventive and academically accoutred.

The relative importance level of each cognitive construct was evaluated according to the total and average scores. The total scores show that the cognitive construct groups such as personal qualifications, academic efficacy, and communication skills rank as the first three cognitive construct groups. Furthermore, this sorting is same in average scores. Based on these results it can be asserted that the lecturers before anything else should have personal qualifications, communication skills and they should also be academically efficient.

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Progress in International Reading literacy study (PIRLS) importance for further development of Georgia's educational system

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Abstract

This document demonstrates the significance of literacy in everyday life both for personal and for public purposes. The current paper is an attempt to deeper understand the meaning and significance of literacy, specifically, its importance for child's earlier ages and consequences which are caused by lack of literacy.

This paper also aims to reveal existing links and gaps between education and literacy in Georgia. Since 2006 Georgia has been a participant country of international tests of literacy – Progress in International Reading Literacy Study (PIRLS). This standardized test exam is held in every four years in fifty five countries and focuses on evaluating achievements in literacy of 4th grade students. The test not only reveals the results in a literacy but it also provides country specific recommendations for improvement and further reforms.

The report provides statements about importance of literacy in the society and then reviews Georgia's low grade in research. Other sections of the report describe reforms in Georgia and research results and recommendations influence on ongoing reforms.

Key words: Literacy, PIRLS, skills, educational research.

Main Conference topic: Competitive Skills/Links between Education and Research.

Introduction

This document demonstrates the significance of literacy in everyday life both for personal and for public purposes. The current paper is an attempt to deeper understand the meaning and significance of literacy, specifically, its importance for child's earlier ages and consequences which are caused by lack of literacy. So it is a central skill and purpose for developing other important skills that made people to be promoted and have good opportunities in their life.

This paper also aims to reveal existing drawbacks and promote literacy in Georgia. Since 2006 Georgia has been a participant country of international tests of literacy –Progress in International Reading Literacy Study(PIRLS). This standardized test exam is held in



every four years in fifty five countries and focuses on evaluating achievements in literacy of4th grade students. The test not only reveals the results in a literacy but it also provides country specific recommendations for improvement and further reforms. Georgia scores below average. The current paper provides for information about statistics and ongoing reforms in Georgia, related to measures taken so far and to finding gaps, which need to be addressed. Georgia participated in international research PIRLS three times. So it is even more interesting to evaluate whether Georgia has made progress, regress or stayed the same in dynamics and management strategies of policy planning regarding literacy.

The report provides statements about importance of literacy in the society within each country and then reviews Georgia's low grade in research. Situation is described in general terms and compared to the achievements of other countries. Other sections of the report describe reforms in Georgia and the experts' position for enhancement of Georgia's education system.

Related work About PIRLS

PIRLS is an international literacy assessment which provides comparative data for achievements in reading among children. PIRLS collects background information regarding the methodology of education systems provides and about existing educational opportunities. PIRLS also provides recommendations, bearing in mind existing results and suggests the way of fill out particular gap solutions. PIRLS show lower and highest by international education achievement assessment grades. It is held conducted association(IEA) once in five years. The most significant reason for this test is necessity of delivering information about 9-10 years (fourth grade) old children's ability in reading skills. PIRLS was held for the first time in 2001. Back then the number of participant countries were thirty six. However, later it grew up to fifty five. IEA's target is to provide comparative research regarding the literacy level for the countries involved in research studies. IEA is an independent international cooperation of national research institutions and government agencies that has been conducting studies of cross national achievement in reading since 1959. IEA pioneered international comparative assessment of educational achievement in the 1960s to gain a deeper understanding of policy effects across countries' different systems of education (Mullis, Ina V. S., Ed.; Martin, Michael O., Ed, 2013). This research is a great support for participant countries to learn about their achievements, compare results and share experiences. It also shows what kind of policy works and what international standards must be shared or taken into consideration. In addition, international research results and recommendations are a great challenge for the process of enhancing educational policy and planning further activities. Finally, they serve as excellent guidelines for gaining knowledge about gaps and drawbacks and way of improvement.

Analyzing to the research held during five years is a good opportunity to observe progress or regress made in dynamic development in the educational field and especially in literacy. Taking into account the research indicators and measurements we are able to see how a student infers the information from new and unknown texts, how he/she connects unknown facts and already known information to each other and whether he/she is available to use the gained information in a practical way or understand the main



context, as well as the content of new information. It also shows how a student estimates and analyses new facts or statements. The PIRLS assessments integrate four types of comprehension processes within each of the two purposes for reading:

- Focus on and retrieve explicitly stated information;
- Make straightforward inferences;
- Interpret and integrate ideas and information; and
- Evaluate and critique content and textual elements(Ina \V.S. Mullis, Michael O. Martin, and Marian Sainsbury 2016).

Regarding the details mentioned above revealed by research and results seem indicate specific country's learning literacy experience but also, compare this information with that of other countries involved. This empirical data include information about the following: national curriculum policies in reading; how the education system is organized to facilitate learning; students' home environment for learning; school climate and resources; and how instruction actually occurs in classrooms.

Many studies show that literacy is the central skill for developing other skills. Many policy makers and countries agree that skill of literacy is significant for personal and community development because of it's overwhelming impact on welfare and personal promotion. Participation in PIRLS is a good support for being aware about peculiar and specific details of literacy in a country. Generally, this international research with recommendations is a policy planning instrument and a guideline for further reforms. However, consideration of these suggestions is another step in policy making.

This chapter is divided into several sections describing benefits of literacy, its importance and its meaningfulness and significance. Some skills are important for a person of the 21st century and the role of literacy for both a personal promotion and a society wellbeing is significant. A special section is dedicated to participation in PIRLS and on the type of information available as well as its implementation.

It is important to define the meaning of literacy. The PIRLS definition of reading literacy is grounded on IEA's 1991 study, in which reading literacy was defined as "the ability to understand and use those written language forms required by society and/or valued by the individual" (Mullis, Ina V. S., Ed.; Martin, Michael O., Ed, 2013). It is supposed that literacy is not only the skill of readying or being aware about a particular author or a book but literacy skill means understanding an unknown text and be able to transfer information in a practical way. Literacy is the ability to read, write, speak and listen to such a level that an individual can fulfill their potential abilities (Trust, manifesto for literacy, 2009). According to research "The Skills for Life: The national strategy for improving adult literacy and numeracy" in the UK today one in six people struggles regarding literacy. Equipped with literacy skills, an individual gains control over their life, but without literacy life experience is dramatically narrowed and opportunities are lost. This not only impacts on an individual's personal success and happiness, but also affects their family, the community they live in, and society as a whole. The research also



showed that improved literacy levels are associated with improved outcomes. For instance, in economic wellbeing, aspirations, family life, health, civic and cultural participation. In each of these areas the people with low level of literacy have lower outcomes, less earnings, less aspirations and high rates of family breakdown and poorer mental and physical health (Trust, manifesto for literacy, 2009). A person without knowledge of how to write and read triggers social and economical problems. Therefore, community without literacy skills or low ability of them is not only a local problem but there is a wider range of problems connected with social and economical issues.

The research "Literacy Changes Life" provides a good insight regarding understanding the connections between literacy and other human life areas such as general wellbeing, employment, promotion, family welfare and other ones. According to the research mentioned above there is overwhelming evidence of connection between literacy and a person's happiness and success. For instance people with low literacy are more likely not to solve household issues or are less likely to have children, or more likely to experience divorce and less likely to have their own house, they are less active in community and are predisposed to drinking and drug addiction. The study also shows that people with lower degree of literacy have lower salaries and they seem to do manual work. A poor reader is more likely to be unemployed and if employed he is more likely to be earning a lower wage with less chances of promotion. Also, poor readers seem to have lower aspiration in career promotion and display less abilities. They seem to be less like to estimate meaningfulness of aspiration in their life. Also, there are some interesting details about family and marriage issues. Specifically, people with low literacy tend to get married at a younger age and are seem to have many children. Women guit education and do only household work. According to the research a low level of literacy is the reason for divorces and a family breakdown. Children growing in these kinds of families are more likely to adopt the same lifestyle with low literacy skills. The literacy level also indicates the attitude toward the health issues. Poor readers are under risk to be addicted to alcohol, cigarettes and drugs and pay less attention to their health condition. Literacy level indicates a civic participation and shows that people with a low level of literacy seem to be people "not at all". So they do not care about voting and social activities (Clark, George Dugdale and Christina, 2008).

There are some important skills that seem to be unavoidable for the 21st century such as critical thinking, problem solving, creativity, communication and collaborative working, leadership and responsibility, productivity and accountability, ICT skills and etc. The research "Literacy Changes Life" claims that literacy is not the reading ability only but the central skill to the many facets of today's life. So it should be a advisable to contemplate the significance of literacy not only for a personal life but for a country's wellbeing and community's welfare.

Skills of literacy are formed at a very early childhood. This period is not short but it needs quite a long time for total formation. Because of that it is recommended to become aware of drawbacks for the purposes of timely intervention. Lack of literacy could be the reason for low grades at school, antisocial behavior and criminal rates. These kind of children easily get angry and have less sense of self- control. Thus, as mentioned above it



means that it is not only a self -problem and private case but they also are a part of community and they are thought to cause some problems for the society itself. Both indepth interviews with experts and statistics show that children with less skills of literacy and oral communication are under risk of failure . Getting older and having to deal with complex, diverse and vast mine of information a child becomes vulnerable and has problems with understanding of information, becomes less active, feels unconfident and has less motivation which triggers drawbacks in every school subject and somehow influences future career promotion. The significance of literacy is shown in Figure 1.



Figure 1 : The model of Cycle of Literacy:

According to Progress in International Reading Literacy Study(PIRLS) the 4th grade of literacy is focused on two types of goal:

1. Getting experience of literature. It means to be interested in reading and fall in love with it. This part includes taking pleasure from reading and accumulating enough vocabulary for future promotion.

Getting information and employing it in a practical way. It means to 2. become knowlegable person. By reading informative texts a student is able to learn new facts and stories which creates an additional support for becoming illiterate person.

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PIRLS study has different types of reading comprehension questions which indicate different factors. Such as:

- 1. Finding superficial information. It could be only one word which explains something or someone.
- 2. Formation of expert opinion. It is about not only one word or sentence but forming any kind of conclusion the reader should think widely about whole text. Making conclusions enhances critical thinking and reasoning ability.
- 3. Linking new information to old one. This part assists realizing the plot of the text and thinking logically, it's a deeper understanding of the text motive.
- 4. Realizing text vocabulary and logical thinking. In this special part a student learns new words and feels the meaning of word combinations. She/he is able to differ real facts from fictional ones.

The study "Literacy Changes Life" shows that literacy as a central skill promotes other basic skills for everyday life and positively influences a human's well being.

There are many significant reasons that influence literacy skills. The level of literacy in the country depends on factors that trigger drawback or promotion of it. Here are the most wide ranged and general factors which are linked to forming that skill: gross domestic product (GDP), educational reforms and literacy policy in primary classes, preschool policy, schools, families, parents, teachers, demographical status and etc. The issue of literacy level is not a local problem only but it is a complex and complicated issue that is linked to a number of different aspects. Libraries, learning methods, national curricula, classes, teachers' professional status are those factors which more or less influence literacy level. Factors affecting the students' thinking skills formation are shown in Figure 2.







Figure 2 : The model of factors affecting the students' thinking skills formation

PIRLS and other reveals say that family factors and parents educational level are also important for children's literacy skill development. Studies say that the children who read books, their parents seem to be more addicted to books and read them whereas others are supposed not even to be interested in them or have lower skills to understand unknown texts. There is an obvious connection between the parent's educational level and a child's literacy skills. Children whose parents are involved in the learning process seemed to have a more higher level literacy skills(Wallman, 2008). School location, studying methods, resources, school security, discipline are the factors that indicate high achievements of literacy level. Schools with various resources and flexible methods seem to make good progress in literacy level. But the most significant factors that are supposed to influence literacy level are teachers and the country's economical status. Teachers' professional ability is highly connected to good achievement in literacy skills. Professional teachers who are always oriented on development, have good teaching experience, know various teaching methods are focused on students demands and needs and have students with good grades in literacy and not only in it (Contexts for Learning to Read, n.d.). Because of complex aspects reflected on literacy level it is hard to indicate the most important factors for developing literacy in the country. But the next section is the attempt of identification of the factors that somehow reflect on the literacy level.

Some political factors are as important as others. For example: some of the countries who are participant in PIRLS have centralized management whereas others do not, they follow flexible politics. It means that schools in different regions have individual studying



methods, curricula and other specifications, while other countries have very strict rules and they do not mind peculiar details of each school and have the same rules to all schools inside the country. Somehow it could be the reason of different achievements in international studies. As mentioned above, one the most considerable reason could be country's gross domestic product (GDP). The amount of money that is spent on educational field. According to PIRLS study the most countries with high GDP have good achievements. Like Canada, Singapore, Finland and etc. But there are some exceptions like Qatar with high GDP but not good achievement in international studies. However, this problem is too complex and confusable with it's religion and traditional factors.

The standardized progress seems to be like colleration between GDP grade and literacy level. But it is too interesting point if the high GDP is connected with the progress of literacy level. Somehow some experts say that GDP is not extra but good support for planning decent activities for improving literacy level inside country.

Reforms and developments have long term impacts so it is too difficult to see the connection between good literacy skilled people and their share in the country's welfare. Canada is a good example of it."The Economic Benefits of Improving Literacy Skills in the Workplace "study demonstrates the importance of literacy at workplaces. Literally empowered staff is supposed to be beneficial for both employers and employees. Studies show that employers pay more to literacy skilled workers. There is a growing recognition that literacy is the critical factor in corporate and personal success.

The study mentioned above shows that Canada's economic well-being crucially depends on effective use of people and their skills. Traditionally, in Canada business and government were focused on finding ways to boost economic growth by increasing consumer spending, encourage business investment and improve export position. But today government and business changed their spotlight on human resources. One great reason of it, as economist say is "the productivity paradox". Despite the investment in machinery and equipment Canada's economic position has fallen (Canada, 1996). After a decade of study it was revealed that no matter how much investment is without adequate capital human resources who are able to manage workplaces there is no sense in boosting of economic field. Highly skilled, literate people are key for increasing country's economical level. The Conference board's study "The Economic Benefits of Improving Literacy Skills in the Workplace" measured perspective of literacy people for employers and employees and analyzed data they had gathered. Data show that companies with good income emphasis on literacy people professional development and they are explored their significant role for business development while people with lack of literacy skills are supposed to have less incomes and low prospects of promotion. According to the study there are quite lot of fields where literacy people are likely to be more aware about such as in: professional skills, time management, quality, self assessment, relationships with coworkers, family status, health condition, wages, incomes and etc. The study revealed that people with less literacy skill earn less salary and they are under risk of becoming economically vulnerable. Statistics show big difference between the incomes of literate person and less literate persons' life. Despite of investing in literacy skill boosting long term impact policy makers should think the benefits of society with high level of literacy. In very recent days Canada is not the only country with high GDP but it is the country with one of the best results in international study of literacy (PIRLS).

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Model of Georgia and other PIRLS countries

Georgia has already participated three times in PIRLS, but only two results are available for public the very last one which was held last year is not available yet. But according to other ones Georgia has low grades in international literacy study PIRLSbelow average. Middle grade is 500 but Georgia in 2006 had 471 points (the ninth place from the very last country) and in 2011- 488 points. Only by 17 was scored and increase was not efficient and still international scores were low compared to other countries. PIRLS has standardized selective frame for participant countries. As usual, better results are in schools of Tbilisi, Kvemo Kartli and Imereti. Study shows that school of big cities had higher achievements in every level of question than villages and small towns in 2011(CENTER, n.d.). Results of urban and rural school in PIRLS 2011 are shown in Table 1.



Table 1 : Results of urban and rural school in PIRLS 2011 - Georgia

According to international test standards it is divided into the four levels of questions: advanced, high, intermediate and low. By 2006 results Georgia has only 1% of advanced level of questions, 20% of high level, intermediate 58%. Results in four levels of questions in PIRLS 2011 are shown in Table 2.

	Highest	High	Middle	Low	Below low
Georgia	2%	21%	60%	86%	14%
International Middle Line	8%	44%	80%	95%	5%

Table 2 : Results in four levels of questions in PIRLS 2011 - Georgia

According to the results study shows that increase is not high there is an extremely little difference between these two years.

It is worth mentioning that the average scaled scores in private schools are higher (542.81) than for public (482.97). The difference between the two were significant in 2011. Results for private and public school in PIRLS 2011 are shown in Table 3.



Table 3 : Results for private and public school in PIRLS 2011 - Georgia

Family and parents education level is significantly reflected on children's achievements. The data reveal that parents with higher education level have children with better grades. International research seems to be a good proof of it (2011 Georgia). Link between parents education and student's result in PIRLS 2011 is shown in Table 4.



Education of Parents	father	Child's Int.grade	mother	Child's Int.grade
With no school education	.3	417	.3	413
Primary level of education (I-IV)	.1	363	.1	433
Basic level of education (I-IX)	3.8	440	6.2	440
School education (I-XI) or	26.2	472	22.1	470
vocational education, college (I- IX) (VET)				
Vocational education, college (I- XI) (VET)	13.3	483	14.8	483
Higher vocational education	20.0	503	18.4	501
Bachelor's degree	19.7	523	19.3	519
Master's degree or doctor's	14.4	533	16.6	529
aegree nN/A	2.2	400	2.1	400
IIIN/A	2.2	490	2.1	490

Table 4 : Link between parents education and student's result in PIRLS 2011

There is an insignificant difference between 2006 and 2011 results of PIRLS in Georgia. So, it is worth being aware of what were recommendations in 2006, what has been done so far and why the results are still below average.

Statistics show that countries which are able to spend more money on education results in international tests are higher and level of literacy seem to be high. It is worth mentioning that their GDP is also high. Experts find it difficult to argue whether the high level of literacy triggers good amount of GDP or vise versa. Countries like Finland, Hong Kong, Norway and Singapore have good GDP and their results are good at not only in PIRLS but in other international tests : program for international student assessment (PISA)and trends in mathematics and science studies(TIMSS). So it seems difficult to find real impact on literacy level and countries GDP. There was information and data that children from rich families have better achievements than children with poor ones.

Teacher factors seem to be considerable for having reflects on students achievement in international studies. Experts and researches say that teachers professional skills and experiences, activities in learning process are considerable(Contexts for Learning to Read, n.d.).

It is remarkable that connection between teacher's subject results and student's grade in literacy is reasonable. Teachers with less experience, knowledge and low subject's grade are supposed to have be reduced their self assessment and motivation for teaching. As a result students are less able to get proper education. Students tend to get vulnerable by not having proper environmental factors that are important while studying process. So, here are some data about teachers subject exam results in primary level in Georgia. Teachers subject exam results in Georgia are shown in Table 5.

<u>Subject</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
Primary (I- IV)	28.27%	24.65%	7.44%	4.26%	3.95%	8.05%
Georgian language and literature (I- VI)		36.96%	31.59%	14.28%	13.12%	10.97%
Mathematics (I-VI)		35.98%	22.42%	22.71%	17.56%	25.28%
Nature study (science) (I- VI)		42.30%	30.52%	14.12%	9.58%	8.91%

Table 5: Teachers subject exam results in Georgia

This data shows that teachers subject exam grades are low. Teachers with less competencies trigger less satisfaction in process. So it could be one of the factors playing a role in students achievements and the whole education system.

This section describes other resembling country's experience with highest scores in international tests and significant development of achievements. The country like this is Russia one of the top-performing countries in PIRLS alongside Hong Kong, Finland and Singapore in 2011. Those countries have good results at reaching top places among participant countries. The results of conducted research are shown in Table 6.

Country	2001	2006	2011
Russian Federation	528	565	568
Singapore	528	558	568
Finland	528	562	568
Hong Kong	528	564	571

Table 6 : General results in PIRLS

Considering the data it is interesting what has been done for these countries and what policy action plan was held. Complex reasons of progress are adequate action plans. Such as:

- Transition to 4 year primary school (63% of 3-year primary school students in 2001, almost all in 4-year primary school in 2006).
- Increase of the student age (10.3 in 2001 and 10.8 in 2006).
- Better per-school preparation.
- Proper National Curricula.

- Wider dissemination of the new textbooks developed on the basis of the child development theory.
- More frequent use of the written tasks of PIRLS type since PILS-2011.
- More individual help to students.
- Many other reasons, not connected with the efforts in education.
 - Improvement of the social-economic situation in families
 - More books, computers, study area for students in the families.
 - Less proportion of children from economically disadvantage families (17%)
 - Decrease of the rural students (12%), etc.

Other important factors that reflect on literacy achievement in Russia Federation are follows:

- Policy of teachers trainings according to PIRLS results.
- Available libraries in primary classes and when children are allowed to take books home.
- Class sizes are not more than 24 children.
- Teachers are obliged to do summative assessment.
- Teachers are obliged to have proper education as a teacher.
- Russia systematically conducts national surveys and assessment and monitors about current events regarding the issue.

Implementation

Bearing in mind the specific purpose of the study two methods were used: (1) the content analysis of the relevant literature -sociological researches, international studies, articles, policy papers, reports and the works of thematic organizations were also used for content analysis.

(2) In-depth Interviews with issue-based experts– three in-depth interviews were also conducted for the purpose of the study. Two of them are experts and work in Teacher professional development center (TPDC) Teachers general competences program manager and primary education expert , one respondent in Georgian primary education development program (G-pried) – program coordinator. One interview was held with a primary school teacher to be questioned about methods while teaching literacy skills, what kind of methods is using while teaching process and do training courses and guidelines support her/him. All the interviewees granted consent to use their opinions in the study.

Results

This section provides a brief overview of the projects launched by the government in order to promote literacy level in Georgia and to improve the country's score in PIRLS. Also it describes the importance of literacy for future personal promotion. These projects

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were conducted in different directions after the first time part

were conducted in different directions after the first time participation of Georgia in 2006 in PIRLS. Due to this it is interesting to overview a timeline of projects when they were done and what were the impacts on the education system of the country.

Experts interviewed reckon that literacy is a central skill and ability to understand some other contexts and is not only the ability to read and write. Skill of literacy should be promoted from the very beginning in a child's life in order to have high grades and promotions at school. During the interviews it became clear that environment with proper books and children, whose parents are involved in their children's education issues, have better grades. The psychologist respondent claimed that not only the environment at school and family is important, but even the words and language we use with the way children reflect on their personal development. The variety of environment and parents description of it determines child's literacy level. So it is important to take children to different places and talk to them about it. In this way they learn new words and unknown contexts. Same importance have the books and their structure explanation while they even are not able to read independently. Problem that was expressed by the respondents is parent's employment and their less time for children. Respondent said: "we can talk about book and what is about, what is the content and idea of the book in order to have contact with child's literacy issue". Technologies and proper computer games are extra support for boosting literacy level but, because of parent's busy life, sitting at computer does not enhance literacy and social skills. Respondents pointed out that literacy skill is a central skill and lack literacy triggers anti social behavior in children, and it is related to country's wellbeing status : "mostly students at school with anti aggressive behavior are with less skills of literacy".

Experts think that international researches such as PIRLS are a good support to be aware about statistics and situation in a particular field that determines for further activities, but it is another question how consecutive planned reforms are or what is the quality of already conducted activities. Experts emphasized that because of the lack of national surveys and researches it is too difficult to monitor new activity's quality or the impact of literacy level. They feel that the issue is too complex and thus needs a deeper understanding.

Respondents pointed out that after first participation in PIRLS some projects have initiated by the Ministry of education and science of Georgia according to the international report. The very first step from 2006 was addition of "literacy" time in national curricula. According to that change primary school teachers were expected to provide students with literacy skills. For this purpose teachers were trained by special training modules "literacy on tutorial time".

Considering the international recommendations TPDC (LEPL Teacher Professional Development Center) started activities for teachers and according to the research some innovative and different sources were implemented in schools such are "Effective reading strategies" film series, sponsored by The World Bank. It was an easy, remarkable and

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multilayered support guide for primary school teachers. Because their beneficial employment these film series were transmitted to schools for further use.

There were Elaborated training modules " Effective reading strategies". 5000 thousand primary school teachers were trained in Georgia, at least one teacher from every school. They were able to study new methods of teaching literacy and how to explain students how to read unknown texts.

Respondents discussed activities which have been done between 2006-2011. But they concerned about Georgia's Primary Education(G-pried) organization sponsored by USAID. Since 2012 this organization focuses on literacy teaching methods in Georgia and conducted various activities till now. 7000 thousand primary school teachers and school directors were trained from all regions of Georgia. Published audio and visual books for teachers and students, have projects were thousand teachers are involved and they get credits by teacher's professional development scheme. This is a double motivation for teachers to get credits and enhance their salary and to become professionally skilled. Respondents mentioned that G-Pried is going to conduct webinars (online trainings) for more flexibility and simplicity of it. They tend to have consultants and monitors and after trainings they are able to monitor trained teachers at the lessons.

Respondents who mentioned the last year's memorandum that was enclosed between TPDC-G-Pried and all twelve universities that had teacher professional development programs. It means that universities are able to conduct or develop their courses and learning resources with help of TPDC or G-Pried. Despite G-Pried's intervention in 2016 international survey PIRLS there is no promotion for Georgia in the process of choosing schools, G-Pried held trainings in only 500 schools, so it is a remote chance to be include all participant schools in survey.

Teacher while interviewing mentioned at the interview that she was satisfied with trainings and guidelines conducted by G-Pried and was using gained knowledge and new methods while teaching. She said : "I always use methods which was taught on trainings, they seem to be useful while teaching process and for special needs students too. We have desk where students are putting their favorite book characters and explain why. In the end of semester the student who will have good explanation and a lot of characters gets the prize".

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Conclussion

According to positive and negative impacts of policy planning government should take into consideration things mentioned below:

From the school perspective:

- Limit number of students in primary schools or classes.
- Trainings of teachers and directors in primary education modern methodology and strategies. Raise teachers awareness regarding evaluating of primary student and type of assessment given.
- Equal accessibility of education for private and public schools (good teachers, books, methodology, infrastructure).
- Equipment all country schools in suburbs with modern primary literature and renewal of the library funds.
- Senior or mentor teacher's support for villager teachers or their distribution there in order to share experience.
- Collaboration between teachers should be part a school life.
- Conduct conferences about primary school education and it's impacts on personal and social promotion.
- Provide opportunities for teacher for participating in exchange programs in order to share international experience or equip them with modern literature about teaching methodology and strategies.

From the ministry perspective:

- modification preschool education system by having literacy preschool classes.
- Conduct country surveys and monitoring plans.
- Create coordination council in order for being aware and monitor conducted, ongoing and further action plans in primary education.
- Adjust teacher's professional development scheme to primary school education.
- Modification national curricular plan to primary school education.
- Modification teacher's professional standards and reading standards according direct necessity.
- Modification primary text books with various teaching methods of reading.
- Decode more vulnerable schools or regions where flexible and adequate policy will adjust there and other schools where individual methods will use. It means less centralized policy using and envisaging features of vulnerable schools.
- Promote teachers profession and enhance interest and drag up high grade students to the profession.
- Teachers who are on their way to start their profession raise their awareness and knowledge about central skill literacy and should have proper teacher preparing programs at universities.

It is essential to block problem from the very beginning, it means to have decent teacher bachelor's or masters program and to prepare them for future career. This way is cheaper, stronger and more beneficial then prepare and train teachers who are already at schools and teach subjects. They are made spend more money with less achievements.

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From the social perspective:

- Booster family/parents involvement in children's studying process. Make them aware of importance of it by trainings and mandatory activities at school.
- Plan some activities where parents and family members will be involved: stakeholders group or voluntaries associations.
- Conduct one mandatory day at school when parents should show their share about teaching process.

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I work in National Center of Teacher Professional Development as an assistant of deputy director and as an assistant of the program of eTwinning Plus Georgia. A field of education is interest of mine, because I graduated master degree in administration of education at Ilia State University in 2015. I have bachelor degree in oriental studies. In 2007 and then 2010 I was studying Arabic language, literature and culture in Syria and Egypt (Damascus University and Cairo university). As a one of the best student I was granted by Georgian President during four years of studying at bachelor degree. I have a good experience of participation in conferences and other academic activities. Some articles and papers of mine had been published by Tbilisi State University. I attended a lot of different trainings, seminars, workshops, conferences, courses and etc. The very last one was Certified Public Policy Analyses program where I got grant because of having one of the best papers.
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Healthcare management: financial and non-financial incentives to motivate employees

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Abstract

The biggest capital of every company are their employees. Companies must give their best to have healthy employees. Because only healthy employees can give their best and only so companies can be successful. But how can companies motivate them for living healthy? It is a complex problem, especially in Germany to teach them for living healthy in private life and also while working hours. Most of them do not realize, how important this issue is. More and more companies in Germany introduced healthcare management in the last years, but the interest of employees is not so big. There are a lot of possibilities to make this topic more attractive for them. Giving them incentives could be a solution. That can be financial and also non-financial incentives.

Keywords: healthcare management, incentive, motivation, employees, companies

Main Conference Topic: Healthcare Management

The Aim of the Study: The aim of this study is first of all to present what healthcare management includes. After that the goal is to describe financial and non-financial incentives in companies to motivate employees for living healthy.

Materials and Methods: This article bases on different healthcare management literature to present what healthcare means. Furthermore different studies were analyzed to find out what kind of financial and non-financial options are possible. Also experienced experts were interviewed and questioned on current issues. The base of the used literature, studies and experts come from Germany.

Introduction

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO, 2003). It is very difficult to define where health ends and disease begins. There is not an exact definition for disease like health. It is clear that even minor disturbances of the body functions can lead to an inability in the professional activities. To prevent disease, prevention is needed.

Humans spend the most time of their life at the work place. Therefore it should be the task of every company to introduce healthcare management. Especially because they have the

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most benefit from it. The healthier an employee is, the better is his or her performance. And the success of every company is depending from the performance of employees.

Healthcare management

Healthcare management includes four different basic pillars as seen in figure 1. There are a lot of more of the pillars, but this are the basic and most important ones. All pillars are voluntary for employer and employee. That is the point, why it seems not so important for the humans.



Figure 1: Basic pillars of healthcare management

Most of the diseases develop at the working place from to less motion. As a result of frequently working activities by sitting through to technological progress, there is a growing sedentary every day at work. Sedentary belongs to one of the greatest risk factor for formation of diseases. Lack of movement can lead to diabetes, overweight, headache, back pain and a lot of more problems. But also the habit of most people, however, goes hand in hand with lack of movement and monotonous movements. In Germany around 30 to 50 percent of the population suffer on back pain (Robert-Koch-Institute, 2012). Most companies know how important motion is for their employees. Many of them organize back training or sport activities while working hours. But they do not reach all employees. People who already are living healthy appear, but what is with the people, who don not live healthy. How can companies reach them to participate at motion programs?

Nutrition is not only vital, it is a decisive factor for well-being and life satisfaction. People who eat healthy have more energy and can concentrate better. In addition bad nutrition leads to many diseases like heart attack, stroke, hypertension. In Germany around 53 percent of women and 67 of men are above their ideal weight (Robert-Koch-Institute, 2012). Also companies are aware of this. As part of healthcare management they offer fruits for free or healthy food in the canteen. Of course people use this opportunities but oily foods like chips or candies were often preferred. Also here people who are living healthy in private life prefer this options, but not the fat ones. How can companies bring the other side also to eat always healthy?

In today's world of work the individual requirements for staff have risen sharply. A lot of people are overtaxed and suffer on burn-out, but they do not realize this. Psychologically stress and stress at work are increasing throughout Europa. In Germany every fourth human has burn-out in the job (Scharnhorst, 2012). The main reason for stress is the pressure of time and the complexity tasks at work. Stress is associated with tension, which needs a relaxation after a certain time. And relaxation can be achieved by physical activity, recreation and rest. Many companies recognized this deficit and started relaxing opportunities in the work. Relaxing rooms or masseurs are coming at the company terrain. Employees are convinced, that this a very good way. But they complain of time lack for this activities. They are too much stressed to invest time therefore. How can companies motivate the staff to relax?

Addiction is also a very important part of healthcare management. The consumption of drugs can reduce the performance of employees and also threat the working climate. Typically substance are tobacco, alcohol, drugs. The reason for addiction are often stress and overtax at work. In Germany 33 percent of working people are smoking (Badura & Hellmann, 2003). Companies dedicate more and more on this topic. They offer coaches against addiction or lectures against addiction while working hours. Employees do not use this activities as requested. It is certainly a fear to seen as an addictive from colleagues. How can companies help the employees to overcome this topic?

An important area of life is the work place. Health and well-being are important prerequisites for the efficiency and satisfaction of employees. During working hours, numerous factors such as the work situation, the working atmosphere and the workplace safety affect the health and the well-being of humans. This affects the performance as well as the personality of the employee. The working world is undergoing a permanent change. Technical progress, globalization and rationalization of the economy force employees to deal with changes and accept them. Consequences are diseases, low performance and missing motivation. Work-related mental stress and physical health risks that lead to a reduction in living and working quality are increasing. There are top 10 advantages for companies by healthy staff as seen in table 1 below (Gesund Aktiv für Firmen, 2014).

1	Reduction in costs by perceptibly diminished sick person's state
2	Improvement of quality
3	Increase of achievement, motivation and productiveness
4	Reduction of the fluctuation by stronger employee connection
5	Support of teamwork
6	Improvement of the work climate
7	Reduction of the mistake and accident rate
8	Strengthening of the identification with the enterprise
9	Increase of attraction and image of the enterprise
10	Department covering communication during the activities

Table 1: Top 10 advantages of hea	hcare management for	[•] companies
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To deal with the increasing burdens, companies have to deal more and more with the health situation of their employees. This includes actively promoting the health and workability of employees. The central prerequisites for company success are motivated and healthy employees. The states also support the companies through grants for healthcare management. Although these state efforts, only 36% of companies invest in the health of their employees (Bechmann, Jäckle, Lück & Herdegen, 2011). As an obstacle to healthcare management many companies see the personal engagement of employees. One third of companies complain about the lack of motivation of the workforce to participate in the measures (Steiner & Baake, 2013). Therefore it is very interesting to see, what kind of incentives are available to motivate the employees to live healthy.

Financial incentives

Financial incentives are measurable in money and have a financial value. Financial incentive systems include all of financial premium offered from the company, which are entitled employees for delivered services (Becker, 2002). With the help of material incentive systems the willingness of the employees to a healthy life should be stimulated. Material incentives have a bigger motivation effect, when the incentives are more individual for the needs of employees. There is not a general rule of a perfect financial incentive system, because every individual has his own interests. For example for one 100 Euro will motivate to use the healthcare management activities and for the other one 100 Euro do not motivate. Here, the idea would be that employees get money per healthcare activity they use. Money is a big factor to motivate employees, but it is not enough. Other factors also influence performance. For employees, who earn not so much money this kind of incentive is certainly an interesting way. For this one, who earn much money non-financial incentives would be more interesting. Here is an important factor, that financial incentives have no limit.

Non-financial incentives

Non-financial incentives are not materially, incorporeal and mentally. They are depending on the situation and motivate people. That can be incentives like promotion, recognition, new tasks. Non-financial incentives are according to social relationships. They aim for example at the relationship with colleagues or the manager, as well as prestige and recognition. There are two kinds of non-financial incentives as seen in figure 2.



Figure 2: Non-financial incentives

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Non-financial incentives can also be categorized in their content as seen in the figure 3 to understand it better.



Figure 3: Non-financial incentives categories

Social incentives arise either between individual employees, between and within employee groups or between employees and managers. Essential here is that every person strives to satisfy his own contacts. In this case one way of motivating to healthcare management can be introducing of regular feedback discussions or recognizing measures such as the "employee of the month" for the employee with most healthy activities.

Organizational incentives are for example working time systems, personal development, corporate culture. Employees can be motivated by giving them incentives such as working time flexibility. If an employee want to go earlier or wants to come later for going to fitness studio, then companies can support this by allowing them flexible working hours. This can be a high motivation point.

Knowledge based incentives are improving and developing the knowledge of somebody. Typical activities therefore are trainings and workshops. According to healthcare management companies can offer lectures to the topic healthcare. Employees can develop here their own interest for a specific topic and offer their colleagues this interests.

The both possibilities of incentive systems were shown. Now the question is if financial or non-financial incentives motivate employees to live healthy. Therefore let's look to a study according to this topic of incentives for motivating employees. In table 2 we can see "what factors motivate leading managers to achieve high performance" (Handelsblatt, 2017).





Table 2: Incentives for leading managers

This table is only based on a questionnaire to leading managers. Therefore not addressed to all employees. It is interesting to see that six of seven answered to topics for non-financial incentives. That has certainly the background that leading managers have a good salary.

If the questionnaire would be made to employees who earn less money the answers could be very different and the weighting to financial incentives would be higher. But as previously mentioned there are a lot of other criteria to note in such of studies.

Conclusion

Goal of this article was to show, what is healthcare management and then to analyze financial and non-financial incentives for motivation humans in companies. This points were describe in the last sections of this article.

As a general rule we can say it is impossible to define the best way to motivate the staff. It dependents from a lot of factors, if an incentive method is good or bad. In every company will be another way the best. Before implementing such an incentive system companies should know their employees better. And it is very important to ask the affected people what are their interests. Also personally information should be collected like age, gender, salary, art of job. This are all influencing factors for the incentive model.

From day to day our working world changes. A lot of humans have a false life setting and above all in following pillars: Motion, nutrition, addiction and stress. Generally every company should do something for the health of the employees. Otherwise they will threaten their competitiveness through the years. Multidisciplinary Academic Conference

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Smartphone Applications Improve High School Students' Learning Achievements

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Abstract

Smartphones are important part of life, particularly for the youth. Smartphone and social media are intertwined phenomena with differing views in public and academic domains in both emerging and developing economies. Swaziland, with a youthful population, has 80% mobile phone penetration yet faced with 60% of high school age children are not enrolled into the school system. This study sought to explore the power of mobile phones and their newly emerging features to enhance teaching and learning at high school in Swaziland, one of the countries in which *Ubuntu* is practiced. 72 high school students; 15-18-year-old participated in WhatsApp Messenger groups where the content of their discussion was analyzed using Fink's Taxonomy of Significant Learning and the Interaction Analysis Model for interaction and cognitive engagement. It was found that WhatsApp facilitates higher levels of cognitive engagement, tutor interaction is indirectly related to students' cognitive engagement and that WhatsApp Messenger made it easier for students to exchange ideas and seek for support.

Keywords: social media, WhatsApp Messenger, cognitive engagement, interaction, *Ubuntu* **Main Conference Topic: E-Learning (Mobile Applications and Learning (M-learning))**

Introduction

High school students are raised in a world of fast speed and constant connectivity to the internet through smartphones and computers. For Swaziland, who has 56% of her population under the age of 18 (UNICEF, 2012), mobile phone penetration is 80% (CIA World Fact Book, 2014). Meanwhile, 60% of high school age children are not enrolled into the school system yet it is the only pathway to higher levels of education (Khumalo, 2013). With such high mobile penetration rates, mobile phones could be used to improve access to educational material and increase the quality of educational outcomes. Smartphone and social media usage by youth are intertwined phenomena with differing views in public and academic domains. On one hand, there are views that they help to make the learning experience more interactive and engaging. On the other hand, there are arguments that they limit time students could otherwise have used for studying. Schools are apprehensive to implement mobile learning due to the inadequacy of available relevant research on such issues.

A hint to solve this confrontation is that Swaziland is a society rooted in the extended family structure, which thrives on maintaining a closely-knit family and communal good. Such a society is weaved together by *Ubuntu* which emphasizes the importance of seeking kindness, respect, individual and communal good to enhance the prosperity of others (Chitumba, 2013). These are the same principles which are at the core of creating learning



communities (Lefa, 2015). It is readily implied that students utilize smartphones and social media. Therefore, considering the skills required from the 21st century workers in preparation, it still can be argued that there could be ways of maximizing the benefits while minimizing negative effects of smartphones. It was for this reason that this study, despite the diverse views, sought to explore the potential of smartphone and social media usage to improve high school students' learning achievements.

Literature Review

Social media consumption continues to be on the rise with 70% of all the time spent on social media accounted for by mobile devices (Mobile Economy Report, 2017). Bryer & Zavattaro (2011) define social media as any technology which makes social interaction, collaboration and deliberation of issues among stakeholders easier. Social media have webbased and mobility characteristics (Davis, Canche, Deil-Amen & Rios-Anguilar, 2012). For this research, social media are defined as technologies and applications that use the internet and enable users to create and participate in various communities. Developments in information and communication technologies have burdened the education sector to innovate teaching and learning. Fast internet connections have increased sources of information thus changing students' learning needs. In higher education, various steps have been taken to meet the demands of the changing educational market. Research has focused on technology usage (Roblyer, McDaniel, Webb, Herman &Witty, 2010), student engagement (Hsu & Ching, 2012), effect of technology student engagement and academic achievement (Junco, Elavsky, Heiberger, 2012), learning preferences (Smit, 2015), attitudes towards peer interaction and learning motivation (Yang & Chang, 2012).

However, social media research in high school education is less extensive. Research has focused on how social media enhanced learning experiences (Charitonos, Blake, Scanlon &Jones, 2012) who found that the online environment facilitated better interactions. Murphy & Lebans (2008) investigated attitudes and beliefs about social media among secondary school students and found that the integration of Web 2.0 tools in classroom teaching increased student engagement. Sharples, Graber, Harrison & Logant (2008) investigated the e-safety and Web 2.0 for children aged 11–16 and found that teachers felt duty bound to protect children from worst case risks hence they restrict their access to social networking sites. Other factors which have been investigated include high school students' participation and interaction in online learning environment (Church & de Oliveria, 2013). Researchers have found that online environment encouraged low level cognitive engagement (Quek, 2010). This could have resulted from using complicated computer-mediated tools hence it was imperative for this study to use WhatsApp Messenger which many students are already using, because it is easier to install, works on various smartphones and cheaper to use (WhatsApp, 2010).

According to Rooney (2013) social media in Swaziland offers a significant opportunity for the distribution of information and sharing of ideas that are not available anywhere else. It is an alternate form of creating and sharing information thus creating new communities (Hlatshwayo, 2014). However, we could not find literature on how social media affects Swazi high school students` learning achievements. There is no-written policy prohibiting the use of mobile phones in Swazi schools however in practice they are banned. Exacerbating the situation was in 2012, when the then Minister of Education and Training publicly condemned the use of mobile phones and social media in schools. Paradoxically, 130 Swazi high school students randomly selected for a study on how high students use their mobile phones in 2015, had smartphones (Mamba, Dlamini, Kohda, 2015). From that study, it was found that Swazi



high school students preferred WhatsApp Messenger. This corroborated findings of studies done by Devi & Tevera (2014) and Hlatshwayo (2014) who found that Swazi youth preferred Facebook closely followed by WhatsApp Messenger. It could thus be said that despite the prohibition policy high school students use smartphones and social media while the widespread of such technologies remain unexplored for teaching and learning purposes. Thus, a realistic desire would be to advocate for the responsible use of such technologies which involves using smartphones and social media to improve teaching and learning.

This study is based on the constructivist theory on how people learn and that learning is both an active and a constructive process. Pedagogically, the smartphone environment facilitates a collaborative and self-directed learning, while technologically affording support to students' cognitive skills development and learning beyond geographic and time constraints. Psycho-socially, it addresses aspects of behaviour, attitudes, motivation and interaction (Quek, 2010). Thus, students' involvement is seen from their participation and interaction. Studies have evaluated the quality of posted messages in terms of co-construction of knowledge, social presence, cognitive presence and critical thinking, using various content analysis models (Quek, 2010). However, there is a research gap on how smartphones and social media affects interactions, participation and level of knowledge construction of high school students, particularly in emerging and developing countries. In this study, Fink's Taxonomy of Significant Learning (2003) and the Gunawardena's et al (1997) Interaction Analysis Model (IAM) were used. The Taxonomy of Significant Learning has six major categories and has been used by researchers and practitioners for improving course design and the actual teaching and learning process (Levine, Fallahi, Nicoll-Senft, Tessier, Watson & Wood, 2008). The Interaction Analysis Model (IAM) has six phases and has been used by various researchers in the study of knowledge construction (Lucas, Gunawardena & Moreira, 2014). This makes these instruments coherent and empirically validated.

WhatsApp Messenger is a cross-platform instant messaging application that employs each user's existing Internet data plan to send and receive a variety of media in real time. Its client software is available for Apple iOS, Google Android, Blackberry OS, Microsoft windows phone, among others (WhatsApp, 2010). On the other hand, *Ubuntu* is a term which originates from Southern Africa used to describe a culturally grounded ethic which influences how people interact with others (Oviawe, 2016). It emphasizes on the importance of interdependency, reciprocal relationships and communal good (Chintumba, 2013). Considering that Swazi high school students are raised under *Ubuntu*, they are more likely to participate in virtual communities, share information and assist each other for the good of their community. Hence it was critical to explore how WhatsApp Messenger in the context of *Ubuntu* can be used to ameliorate some of the challenges faced by high school education.

Methodology

The objectives of this study are to explore the potential of mobile phones and their features to enhance teaching and learning. The study will answer one Major Research Question (MRQ) and two Subsidiary Research Questions (SRQs).

MRQ: How do smartphone-based applications affect high school students' learning behaviours?

SRQ1: How do social relations in smartphone mediated learning environment affect high school students learning achievements?

SRQ2: How do smartphone-based applications affect students' learning achievements?



This was an action research, a widely preferred research method for technology mediated studies (Hearn, Kimber, Lennie & Simpson, 2005). It is a process of studying an education system to understand and improve the educative process (Johnson, 2012) to enhance the lives of both students and professionals (Hine, 2013). In such studies, the researcher is both a participant and a facilitator (Hearn et al, 2005). For this study, the researcher is a curriculum developer in Swaziland where there is raging debate on the effectiveness of mobile devices and social media for the teaching and learning process.

The sample consisted of 72; 15-18-year-old students sampled from three of the so called 'good' schools and five from the so called 'ordinary' schools in Swaziland. Consent was obtained from the Ministry of Education and schools. One Form four (Grade 11) class, with an average of 25 students, in each of the eight schools was given consent forms to take to their parents. Those who received parental consent were then enrolled into the study. Participants were to discuss any mathematics or physics content to improve their understanding. These groups, however, did not replace conventional teaching but served to extend academic consultation to even after formal school hours. There was no discussion about *Ubuntu* with participants as it was assumed that they are being brought up under that philosophy. Details of group formations are given in Table 1.

GROUPS	# of Members	Gend	Good Schools			Ordinary Schools						
		Female	Male	Α	В	С	D	Е	F	G	Н	
MGO56	5	5	-	1	1	1	1	-	1	-	-	
MGO58	5	3	2	1	1	-	1	-	1	1	-	
MGO76	7	5	2	2	1	1	1	1	-	1	-	
MG077	7	4	3	1	1	1	1	1	1	1	-	
MGO78	7	4	3	1	1	1	1	-	2	1	-	
MGO95	9	3	6	1	1	1	2	1	1	1	1	
MGO96	9	4	5	1	1	1	2	1	1	1	1	
MGO97	9	3	6	1	1	1	1	1	2	1	1	
PGO72	7	-	7	1	1	-	1	1	1	1	1	
PGO77	7	5	2	1	1	1	1	-	1	1	1	
TOTAL	72	36	36	11	10	8	12	6	11	9	5	

Table 1: Details of formed groups

Data Analysis

NodeXL Pro, an add-in for Microsoft Excel that supports social network and content analysis (Hansen, Shneiderman & Smith, 2010) was used to analyse each group participation. Betweenness centrality was calculated which Girvan and Newman (2002) define as the number of the shortest paths that go through an edge in a graph or network. It can then be used to establish the extent to which a member of a network influences the network or group activity. The degree of centrality was used to ascertain the extent to which participants are either proactive or reactive. A sample of network analysis is shown in in Figure 1.



Key: Size of node = betweenness centrality Colour: light to dark = small to big closeness Figure 1: Resultant Group Network Analysis



Students' WhatsApp messages were coded by the researcher and two Swazi teachers who are experts in pedagogy and curriculum studies, using Fink's Taxonomy of Significant Learning (2003) schema. The inter-rater reliability, Cronbach's Alpha was found to range from $0.81 \le \alpha \le 0.92$. To understand the learners' process of knowledge construction and to some extent triangulate findings, the coders went on to code messages using the IAM. The inter-rater reliability, Cronbach's Alpha, ranged between $0.7 \le \alpha \le 0.86$.

Findings

In all the groups, the 'all' participant had the highest in-degree centrality; students were directing their discussions to the whole group than individuals. It was found that participants interacted more amongst themselves than they would with the tutor. Furthermore, for all the participants the out-degree centrality value is always greater than the in-degree centrality. The results of the participation analysis are shown in Table 2.

Participants	MGO 56		MGO 56		MGO 56		MGO 56		MGO 56		MGO 56		MGO 56		MGO 56		pants MGO 56		M 58	GO	M(76	90	M 77	GO	M 78	GO	M(95	30	M(96	30	M(97	30	PG	072	PG	077
	1	0	1	0	1	0	1	0	1	0	Ι	0	Т	0	Ι	0	Ι	0	T	0																
All	5	0	5	0	6	0	6	0	4	0	5	0	6	0	5	0	5	0	7	0																
Tutor	1	2	2	3	0	2	2	2	1	2	3	4	2	3	1	2	2	3	4	6																
Participant 1	0	2	2	1	5	3	2	4	3	4	0	1	1	2	3	4	0	1	3	4																
Participant 2	1	1	1	3	0	1	3	5	1	3	1	3	4	5	0	1	1	2	4	5																
Participant 3	1	2	0	2	0	1	4	6	2	2	2	3	1	2	1	2	1	2	6	7																
Participant 4	0	1	0	1	0	1	3	3	-	-	3	3	3	4	1	2	1	1	3	3																
Participant 5	-	-	-	-	0	1	1	1	-	-	-	-	1	1	-	-	1	2	1	2																
Participant 6	-	-	-	-	2	3	-	-	-	-	-	-	1	2	-	-	-	-	2	3																
Participant 7	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-																

Table 2: Summary of participation analysis

Key: I = In-degree; O= Out-degree

Out of ten groups, only four had messages which could be categorized as foundational knowledge, with three of the groups showing 12% or less of the messages. Overall the human dimension had the highest classification, followed by application and learning to learn. In addition, almost all groups had a representation of messages in the integration and caring categories. The results of the content analysis using Fink's Model are shown in Table 3.

Fink's Model		Message Classification (%)								
	MGO56	MGO58	MG076	MG077	MG078	MGO95	MGO96	MGO97	PG072	PG077
Foundational		45	4	-	-	-	-	-	12	11
Knowledge										
Application	31	5	18	18	24	37	10	11	7	19
Integration	3	3	2	11	10	13	13	2	-	21
Human	40	19	40	32	28	34	53	64	42	29
Dimension										
Caring	7		28	19	8	5	7	14	20	18
Learning to	19	28	30	19	31	12	16	23	20	13
learn										

Table 3: Content analysis using Fink's Model

Groups MGO77 and PGO77 had message representations in all the categories. This is irrespective of the total number of messages for each group since MGO77 had 46 messages while PGO77 had 126. More than 60% messages were in Phase III, with traces in Phase IV and V. The results of the content analysis using IAM are shown in Table 4.

Table 4: Content analysis using IAM

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Interaction Analysis Model				1	Messa	ge Cla	ssificat	tion (%)		
		MG	MG	MG	MG	MG	MG	MG	MG	PG	PG
Phase I: Sharing and comparing of	A. A statement of observation or opinion	-	7	1	2	-	10	-	-	-	3
information	B. A statement of agreement from participants	2	-	4	2	-	1	-	-	-	1
	C. Corroborating examples provided by others	4	2	-	2	-	4	4	-	-	6
	 Asking and answering questions to clarify details of statements 	12	11	3	16	7	15	2	2	2	8
	E. Definition or description of a problem	8	-	-	3	4	4	1	-	2	7
Phase II: The discovery and exploration of	A. Identifying and stating areas of disagreement	-	-	-	3	-	4		-	-	1
dissonance or inconsistency among ideas, concepts or statements	 Asking and answering questions to clarify the source of disagreement 	4	21	2	3	6	-	5	5	4	11
	C. Restating the participant's position and possibly advancing arguments	-	-	-	-	-	-	3	-	-	-
Phase III: Negotiation of meaning/co-	A. Negotiation or clarification of terms	2	21	31	9	32	11	16	23	35	9
construction of knowledge	B. Negotiation of the relative weight to be assigned to types of argument	-	2	-	-	-	3	-	-	-	-
	C. Identification of areas of agreement or overlap among concepts	6	2	5	-	10	12	11	5	4	4
	D. Proposal and negotiation of new statements	62	35	49	58	41	36	56	65	52	37
	E. Proposal of integrating or accommodating analogies	-	-	-	2	-	-	-	-	-	3
Phase IV: Testing and modification of	A. Testing proposed synthesis against "received fact"	-	-	-	-	-	-	-	-	-	7
proposed synthesis or co-construction	B. Testing against cognitive schema	-	-	5	-	-	-	-	-	-	-
Phase V: Agreement statement(s)/applications of new meaning	A. Summarization of agreement(s)	-	-	-	-	-	-	-	-	-	2

Discussion

The network analysis of each group showed centralized interconnected webs. Individual students had the highest centrality thus discussions were student-centred. It emanated that students sought clarifications and challenged each other's knowledge. They would however need the tutor to clarify or confirm certain concepts. It was concluded that students need someone more knowledgeable as a point of reference from time to time. Furthermore, it emanated that students can take control of their learning which they can easily pass on an authority they trust when a need arises. This corroborated findings that online learning does not alter the disciplinary power of classrooms and teacher controlled learning (Zhu, 2006). However, it allows various participants to direct and lead the learning process thus allowing them to develop collaboration and negotiation skills.

WhatsApp Messenger in the *Ubuntu* context made it easier for more participants to reply to other participants messages than they would initiate discussions. The out-degree centrality was always greater or equal to the in-degree centrality for all participants. Hence it was concluded that the smartphone environment encourages even the shy students to participate in the learning process. This is contrary to the findings of Yang & Chang (2012) who found that interaction only occurred when it was intentionally integrated into the course design rather than the environment. This research also found that the human dimension category had more messages than any other category. This showed that students were always conscious of social norms and values while interacting. This is in line with Church & de Oliveria (2013) findings that interactions in a virtual environment formed a social atmosphere where participants developed a sense of belonging and a feeling of community.

The study found that students did not require as much factual information as they required high cognitive engagement. Six out of ten groups did not have any messages under the low cognitive engagement. The IAM classification also showed that more than 60% of the messages were classified as Phase III. Phases II, IV and V were little explored. However, according to the findings of Quek (2010) most conversations in online discussions satisfied the low of cognitive engagement. WhatsApp Messenger in the *Ubuntu* context provided an environment where interactions between students were developed and were improving. It made it easier for participants to express their care about each other, the learning process and the subject matter. It made it easier to send immediate and personalized feedback which



would be impossible in a physical classroom. This is line with the findings of Driscoll (1994) who posited that online communities are interactive environments offering effective means for implementing constructive strategies which would otherwise be difficult in other environments.

It was found that there was no direct relationship between levels of cognitive engagement and types of interactions. Group PGO77 had the highest total number of messages and had messages classifications in all the levels of the IAM. In addition, it had the highest number of messages in the application and integration levels of Fink's Model. Furthermore, group MGO76 had the highest percentage of messages in Phase III and some messages in Phase IV of the IAM yet the other groups did not have at all. We may, however, infer that higher cognitive engagement may be indirectly related to the tutor's involvement as suggested by the higher centrality of the tutor in the two groups. This supports findings by Zhu (2006) who found that students might find it difficult to achieve independent competency without proper scaffolding from a mentor.

Conclusion

The rapid technological advancement and the vast array of smartphones applications make it cheaper and easier to access the internet. This facilitates the creation of virtual communities, the existence of which not only improves the quality of discussions but improves the levels of cognitive engagement. Though this study explored, over a limited time span, how smartphone based applications affect high school students' learning, we concluded that WhatsApp Messenger in the Ubuntu context facilitated higher levels of cognitive engagement which increases higher order thinking abilities and as such improves learning achievements. Ubuntu emphasizes that students view each other as members of extended family hence encourage communal prosperity. This minimizes the urge to maintain competitive advantage between students hence facilitates easier exchange of ideas. Ubuntu teaches that the relationship between a person and the community should be reciprocal, interdependent and mutually beneficial. Thus, students were quick to take leadership roles in the discussions triggering even shy students to participate. It was also found that students observe social norms and values while interacting with others which suggests that with the proper guidance many fears around high school students' use of mobile phones can be alleviated. The type of interaction between the tutor and students was inferred to be indirectly related to the level of students' cognitive engagement. Further research is required to understand why this study found that most WhatsApp discussion messages were categorized in higher cognitive engagement level yet other studies found that online discussion message are mainly limited to the low cognitive level of engagement. A likely explanation could be the study setting whereby Swazi students are more willing to share and progress together than to maintain a competitive edge peers. Another explanation could be on the discussion content. In this study, the forum was used to consolidate what students may have learnt at school and did not understand.

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The Process of Establishing Individualized Vocational Plan by Operating Case-Conference in a Sheltered Workshop and the Meanings Founded in the Whole Process

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Abstract

The purpose of this study is to examine the meanings founded in the process of establishing Individualized Vocational Plan by operating case-conference. Action research is applied to achieve the objects of the study. The case-conference members consists of an executive of the sheltered workshop, vocational rehabilitation teacher, professor who majored vocational rehabilitation of autism spectrum, professor who majored applied behavior, and the researcher. The process of establishing Individualized Vocational Plan had been checked and modified during seven times of case-conference, and the researcher, who is as participant and cooperator of the action process, had participated in the research place to collect the data which was analyzed by an inductive method.

As a result, 3 upper classes were categorized: (1) take a case-conference out of a closet, (2) throw an ecological curriculum in the world of vocational rehabilitation, and (3) read an individualized vocational plan as a individualized support plan for vocation. These three upper classes has 9 of middle class and 27 of meaning units.

The conclusions are as follows. First, the case-conference plays an important role of implementing the case-management. Diverse experts had a chance to decrease the difference of the opinion and could meet on the agreement about individualized vocational plan. Also, there was a need for setting the case-management system by having regular case-conference to facilitate effective approach to workers with disabilities. Second, there should be flexibility in the process of establishing an individualized vocational plan so it could cover overall life of workers with disabilities as well as their vocational needs. Lastly, individualized vocational plan should focus on the quality of life of workers by providing a support that meets their needs.

Keywords: sheltered workshop, case-conference, individualized vocational plan, case-manag ement, action research

Main Conference Topic: Special Education



Introduction

Employment is one of the most important factors for people with disabilities to be included in a society. However, many students with disabilities in Korea are having difficulty with getting a job after graduation from high school. Sheltered workshop is a facility that provides people with disabilities with a sheltered environment so they can work with people who understands and helps them improving work skill.

However, according to statistics survey in 2013, it is reported that 1.42% of the total number of disabled workers are under employment (Ko J., Kim H., Kim S., 2014), which raises doubts as to whether the rehabilitation facility has faithfully fulfilled its role. In addition, a survey of 1,742 persons with disabilities showed that their satisfaction was lower than the average (Kim K., 2011), indicating the need to improve the quality of employment along with the goal of employment of people with disabilities.

Therefore, systematic case management centered on consumers is suggested through various studies as a way to meet the employment rate and job satisfaction through employment suitable for individual needs in vocational rehabilitation facilities. In order to solve these complex needs and to promote employment, vocational rehabilitation facilities should be managed as a case management system (Shin, H., Kang, B., Choi, Y., 2011). Case management is to provide continuous support by integrating various services of the community in order to systematically support the disabled with complex needs (Yang Y., Choi S., 2008). It is important to accurately diagnose the ability and desire of the subject when carrying out case management and to establish an individualized vocational rehabilitation plan suitable for the diagnosis result.

Individualized vocational rehabilitation planning is an important process to discuss the goals of rehabilitation and concrete action plans by participating jointly by relevant experts and gaurdians in order to provide appropriate support for persons with disabilities (Lee D., 2014). In order to establish an effective individualized vocational rehabilitation plan, it is essential to have opportunities for experts from various fields to demonstrate their expertise and cooperate.

Therefore, this study aims to examine the meanings founded in the process of establishing Individualized Vocational Plan by operating case-conference. The research question for this purpose is 'What is the implication of the process of establishing and operating an individualized vocational rehabilitation plan through the case-conference of M sheltered workshops?'

Method

The researcher spent the first month of April 14, 2015, to identify the environment and atmosphere of the study site and to form Rapport with participants before the full implementation of the case-conference. Since then, researcher participated from the preliminary meeting to the 6th case-conference on December 16, and participated twice a week as observers and collaborators in the planning process established at the case-conference. After completing the preliminary work up to the 4th case-conference, the 5th case-conference and the 6th case-conference were held to establish and apply the individualized vocational rehabilitation plan in earnest.

The data collection in this study is largely divided into the collection of data at the caseconference and the collection of the data on the implementation process between each caseconference Observation data, case study data, interview data, and researcher reflection logs were collected to analyze in a qualitative way to draw the implications of the implementation process through the case-conference. Multidisciplinary Academic Conference

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Results

As a result, 3 upper classes were categorized: (1) take a case-conference out of a closet, (2) throw an ecological curriculum in the world of vocational rehabilitation, and (3) read an individualized vocational plan as a individualized support plan for vocation. These three upper classes has 9 of middle class and 27 of meaning units

Results of conducted experiment are given in Table 1.

Top Categories	Subcategory						
Take a case meeting	Current status of vocational rehabilitation facility						
out of the closet	The case-conference works as a basement for life circle support-						
	Principles of ecological curriculum						
Implementing a vocational rehabilitation by using	Advantages of ecological curriculum						
ecological curriculum	Taking ecological curriculum into the vocational rehabilitation						
Not personalization vocational rehabilitation plan but	Establishment and application of individualized vocational rehabilitation plan						
read personalization life support plan	Focusing on the support rather than traring						

Table 1: Results of interviews

Conclusion

The purpose of this study is to derive the implications of case management practice in establishing and operating an individualized vocational rehabilitation plan through the caseconference in M sheltered workshops, and to provide suggestions for providing personalized vocational rehabilitation services in the future. For this purpose, we organized 7 case meetings for 8 months, which consisted of the chairman of the M sheltered workshop, vocational rehabilitation teachers, two special education professors who are experts in the special education, and researchers. In this process, the researcher participated in the implementation process as observer and collaborative practitioner by invoking the research methodology.

The conclusions are as follows. First, the case-conference plays an important role of implementing the case-management. Diverse experts had a chance to decrease the difference of the opinion and could meet on the agreement about individualized vocational plan. Also, there was a need for setting the case-management system by having regular case-conference to facilitate effective approach to workers with disabilities. Second, there should be flexibility in the process of establishing an individualized vocational plan so it could cover overall life of workers with disabilities as well as their vocational needs. Lastly, individualized vocational plan should focus on the quality of life of workers by providing a support that meets their needs..

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The Experience and Meaning of Special Education Teachers in Industry Field Training Conducted for the Special Classes in High School

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Abstract

This study analyzes the work experience and meaning of high school special class teachers who have industry field training of the students with disabilities and provides useful information on teachers. To do this, we conducted in-depth interviews with 6 special class teachers in high schools and analyzed them by Giorgi's phenomenological method.

The results of the study, it was deduced to 4 high-ranking categories, 11 subcategories. First high–ranking category is 'Quality of industry field training, teacher philosophy and competence are decisive factors'. Subcategories on that are composed of 2 kinds such like 'The responsibility of teachers', 'The ability of teachers to cope with industry field training environment'. Second high–ranking category is 'Capabilities plus support'. Its subcategories are 3 kinds such like 'Limitations of teachers individual competence', 'Support functions of the transition education support center', "Strengthening teacher support'. Third high–ranking category is 'Policy will and regional networking'. Its subcategories are 4 kinds such like 'Skill-building skills through repeated training', 'Developing Responsible Workers with Job Functions', 'From the understanding of disability and information sharing', 'Minimum guaranteed working condition for students with special education'

Keywords: experience and meaning of high school special class teachers, industry field training of the students with disabilities, Giorgi's phenomenological method **Main Conference Topic:** Special Education

Introduction

Career and vocational education for students with special needs is a necessary and sufficient condition for achieving self-realization and social integration that is the goal of special education. This is because the students with special needs through career and vocational education in high school will get to work. The more they are satisfied with their economic activities during their work life, the higher the quality of life will be. It will lead to social integration (Kim, Y., Lee, H., Lim, K., 2012).

In order to achieve this goal, students should be educated in a community environment where they live (Yoon, T., 2008). In order to improve the quality of special class vocational education, it is necessary to provide vocational skills and training in the field where students with special needs work after graduation (Lee, S., 2014).

Although the teacher who runs the field practice in the high school has the help of the organization such as the disabled employment agency and the welfare center in the region to link the field practice and the employment or the career teacher steadily exchanges with the company (Yoo, S., Lim, K., 2014), it is necessary to share roles among special education



and vocational rehabilitation agencies (No, S, Yoo, E., Kim, G., Lee, Yoon., Kim, S., & Lee, H., et. al, 2011). There is a need for networking with employment agencies for the disabled, community welfare centers, and organizations that can work in the local community (Kim, J., Lee, Y., Choi, S., 2001). Not only the special class management but also the career and vocational education in high school can be different according to the teacher's preference or philosophy. It is necessary to discuss the meaning of the teacher's experience.

Therefore, this study aims to provide useful information about the practical training to the special class teachers in high school by studying various experiences and meaning of the special class teacher in high school through field practice through the phenomenological method. The questions of the research are 'What is the special teacher' s experience in field practice of special class in high school and 'What is the meaning?'

Method

This study used Giorgi's phenomenological reduction method (Giorgi, 1985). Participants were five female participants and one male participant who had worked in South Korea. The period of their experience in field practice was varied from one year to five years. The participants were interviewed through open - ended questions to gain experience and meaning of field practice. I met the research participants one-to-one and asked the participants about the overall part of the on-the-job training operation, "If the teacher has experienced on-the-job training at a special class in high school, could you tell me about it in detail?" After recording interviews, all data were typed. The data were collected through the interviews for nine months. The interviews took an hour and a half in average. Interview recordings were arranged in 73 sheets of A4 size paper with size 11, spacing 0, and line spacing 160.

Results

The data obtained through interviews were analyzed according to Giorgi 's 5 - step data analysis. The results were as follows:' field practice, following teachers 'philosophy and competence', 'supporting capacity addition', 'policy - based willingness and local networking' 'Were categorized into four upper categories, 11 subcategories.

Results of conducted experiment are given in Table 1.

Top Categories	Subcategory
On-the-job training,	Teacher's responsibility
and competence	Teacher's ability to respond on the practice
A1 '1', A 11	Limitations of individual teacher capacity
Ability to add	Support functions of the Transition Education Support Center
capabilities	Strengthening teacher support
Policy willing and	Public agency initiative
regional networking	Finding possible cooperative cooperation system
	Functional mastery with repetitive training
Systematic field	Responsible job training
construction	From the understanding of disability and information sharing
	Ensure minimum workplace conditions

Table 1: Results of interviews

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.Conclusion

Although the special teachers had difficulty in carrying out both the teaching and the field practice, they were supporting the adaptation of students with special needs in the field of business. Effective on-the-job training requires active supports for teachers such as financial support, support for transition education centers, initiative in public institutions, and cooperation system. In addition, it was confirmed that the number of jobs that are guaranteed minimum working conditions should be increased for students with special needs.

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The Effect of Visual Thinking Strategies on Students' Participation in Science Class and Academic Achievement of Students with Intellectual Disabilities in Middle School

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Abstract

The purpose of this study is to find out the effect of visual thinking strategies that utilizes thinking maps on students' participation in science class and academic achievement of students with intellectual disabilities in middle school. Utilizing thinking maps refers to procedure that students can understand what they have to learn by expressing their opinion with pictures or writings to one of thinking maps provided by teacher.

To achieve a purpose of this study, a multiple baseline design across subject was applied to three of students with intellectual disabilities. After an implementation of normal science class during the baseline period, the visual thinking strategies were practiced in intervention period once a week for fifteen weeks. Lastly, sustainability was checked during a maintenance period. Inter-scorer reliability was secured by one trained research fellow who observed the changes of students' participation during all of the research procedure. Academic achievement of students was evaluated by pretest and post-test.

As a result, there was an increase of three students' participation and academic achievement of students in science class. Therefore, it is founded that the visual thinking strategies using thinking maps have a positive effect both on students' participation in science class and academic achievement of students with intellectual disabilities in middle school.

Keywords: visual thinking strategies, thinking maps, a multiple baseline design across subject, students with intellectual disabilities, science class

Main Conference Topic: Special Education

Introduction

Vygotsky (1962) argues that concrete manipulator students can more easily remember visualized information than descriptive text. This suggests that the use of visualized tools is effective in the acquisition of knowledge in the education of students with mild intellectual disabilities. In addition, visualization ability is a basic method for processing or thinking information, so it is a good way to appropriately use text (left brain) and vision (right brain) as well as basic skills necessary for all subjects (Kang, H., 1996).

We can not remember the text that we read long ago, but remembering the image of Ann, who pledged friendship amid the cherry blossom leaf in "Redhead Anne," is because we



better accept and remember images than rules or logic (Woo, C., 2015). This visualization is a strategy that can transfer knowledge and information effectively and quickly.

In summary, most of the previous researches have proved the effectiveness of the visualization tools according to the defined rules centering on the visualization tools (mind map, graphic organizer, Thinking map), which are sorting and sorting thoughts. Such visualization tools are also rarely conducted with students with disabilities. Therefore, in this study, we will use Visual Thinking Maps, which is one of the most visual tools, to operate a visual thinking strategy program in the form of talking about thoughts while recognizing various picture expressions instead of texts.

The purpose of this study is to develop a science class program for students with intellectual disabilities in middle school. In particular, we will examine the effectiveness of visual thinking using one of the eight Thinking Maps, a tool for visualization at every school, and examine the possibility of applying it to various subjects in the future. Research questions are as follows. First, what is the effect of visual thinking strategies on students' participation in science classes in middle school students with intellectual disabilities? Second, what is the effect of visual thinking strategy on science and academic achievement of students with mental retardation in middle school?

Method

In this study, three middle school students with intellectual disabilities in J middle school in Chungcheongnam-do were selected as the study subjects. Three students were experimented with the baseline, intervention, and maintenance stages with the subject multiple baseline design. In the baseline period, the class was taught with the existing text - oriented lesson and the visual thinking strategy was applied during the intervention period. We also confirmed the sustainability of this strategy during the maintenance period.

Results

As a result, it is founded that visual thinking strategies has an positive effect both on students' participation and academic achievement of students with intellectual disabilities in middle school. Results of conducted experiment are given in Picture 1 and 2.

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Picture 2: The effect of visual thinking strategy on students' academic achievement





Conclusion

The purpose of this study is to find out the effect of visual thinking strategies that utilizes thinking maps on students' participation in science class and academic achievement of students with intellectual disabilities in middle school. In order to achieve the goal, three students with intellectual disabilities were experimented with the baseline, intervention, and maintenance stages with the subject multiple baseline design. In the baseline period, the class was taught with the existing text - oriented lesson and the visual thinking strategy was applied during the intervention period. The conclusions are as follows. The visual thinking strategy class had a positive effect of increasing the students' participation in science class and academic achievement of students with intellectual disabilities in middle school. Therefore, visual thinking strategy is an effective teaching strategy for students with intellectual disabilities to participate in class and improve academic achievement.

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The Effect of Speed-based Word Reading on the Comprehension Ability of Children with Autistic Disorder

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Abstract

The purpose of this research is to investigate the effect of speed-based word reading on the reading ability of autistic children. The multiple base-line across behaviors design was used to see the effects of intervention on three target behaviors that were functionally similar and independent under the same subject and environmental conditions. The authors conducted $2 \sim 3$ baseline tests, $5 \sim 6$ sessions, and $5 \sim 11$ sessions of autopsy examinations for 7 weeks of autistic children in 2nd grade of elementary school. The effect was verified. The results of the study show as follows. First, the children's reading fluency was improved by fast reading words. The word recognition process also became fast. Second, speed - based word reading improved reading comprehension. Reading a key word in a text quickly and repeatedly makes children expect what they read. Suggestions based on this study are discussed for future research.

Keywords: the effect of speed-based work reading, reading ability of autistic children, the multiple base-line across behaviors design

Main Conference Topic: Special Education

Introduction

We acquire knowledge through reading, communicate with people, and engage in social activities. Reading is an ability that must be mastered in effectively coping with various situations and living as a member of society. Reading is a process of semantic composition in which a variety of factors are involved in the interaction between the reader, the environment, and the writing contents (Seo, H., 2009), and various techniques such as word discrimination, concept understanding, This is a very complex inter-course that needs to be learned (Lee, C., 2005). Reading is one of the important communications in our lives and is very important for learning and social life.

Children with normal development have no problem in learning reading skills in a natural environment, but children with disabilities may have difficulty acquiring reading skills depending on their differences in ability. The results of precedent studies are summarized as follows. First, autistic children with autism have a significantly lower reading comprehension than children with autism. In addition, children with most speech impairments are deficient in listening comprehension, and children with autism-cognitive impairment also have low performance in listening comprehension.

Recently, the importance of reading fluency has been emphasized as a reading variable because it has a meaningful relationship with reading comprehension. It is important to be able to read at a rate sufficient to hear the story because the speed of the speech reading



response is a key to the celadon competence in reading. If the speed is not enhanced, the reading reaction can be a response that depends only on visual stimuli.

Through the learner's reading, the learner reads through the learner's voice and the auditory reading through the learner's reading, and through the memory of the visual, which has a positive effect on children who have difficulty communicating. Therefore, the purpose of this study is to analyze how the accuracy and speed of reading, which is a component of oral reading fluency, affect reading comprehension. The research questions are as follows.

First, does speed-based word-reading improve the performance of listening comprehension in children with autism? Second, does speed-based word reading improve children's reading comprehension in autistic children? Third, does the reading of words based on speed criterion improve the performance of reading comprehension by the eyes of autistic children?

Method

The research subjects were elementary school students belonging to elementary school integrated class which received speech therapy and cognitive learning therapy. Behavioral intervention was conducted through the baseline, intervention, and maintenance phases through the design of the baseline. The intervention was carried out sequentially when the preliminary target behavior reached the baseline level. The intervention also allowed the target action to stop when it reached the baseline level. In other words, arbitration began in goal action 1 during the third session, in which the baseline of all target behaviors was stabilized (goal actions 2 and 3 observe the baseline state during the intervention of target action 1) We began the intervention of target action 2 in the 10th session which seemed to reach the stable level that the effect showed clearly. In addition, we initiated the intervention of target behavior 3 at the 16th session when the intervention effect of target action 2 reached stable level.

Results

As a result, it is founded that speed-based word reading has an positive effect on children's reading fluency, listening comprehension, and reading comprehension by the eyes. Results of conducted experiment are given in Picture 1.

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Picture 1: The effect of speed-based word reading on target behavior

Conclusion

The purpose of this research is to investigate the effect of speed-based word reading on the reading ability of autistic children. The multiple base-line across behaviors design was used to see the effects of intervention on three target behaviors that were functionally similar and independent under the same subject and environmental conditions. The authors conducted $2 \sim 3$ baseline tests, $5 \sim 6$ sessions, and $5 \sim 11$ sessions of autopsy examinations for 7 weeks of autistic children in 2nd grade of elementary school. The conclusions are as follows. The speed-based word reading had a positive effect of increasing children's reading fluency, listening comprehension, and reading comprehension by the eyes. Therefore, speedbased word reading is an effective teaching strategy for children with autism spectrum disorder to improve reading skill.

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Strategy Maps As A Means To Visualize The Strategy¹

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Abstract

The purpose of this study was to demonstrate the very process of creating a strategy map for an educational organization stage by stage. The strategy map is a technique that depicts cause-and-effect relationships between the strategic components of an organization and the relevant units. It is a qualitative study conducted through "design based research" (DBR) procedure which was developed to generate solutions exclusively in educational sciences. The main research questions were determined as: (1) "What is the strategy map?" and (2) "Which steps should be followed in the process of creating a strategy map in school environments?" The strategy mapping process was carried out in a private school in the province of Gaziantep/Turkey. The strategy maps are among the components of a strategic performance management tool named Balanced Scorecard (BSC). Therefore, the first steps of BSC process were followed to create the strategy map. As a result of the research, the tenstep strategy mapping process was implemented successfully, the school strategy was visualized thanks to the strategy maps, and cause-and-effect relationships were clarified.

Keywords: balanced scorecard, strategy map, school, strategic planning **Main Conference Topic:** Educational management

Introduction

Balanced Scorecard (BSC), developed by Kaplan and Norton in the 1990s, is a measurement-based strategic performance management system that sets a framework for strategic performance measurement and management through transforming mission and strategies of organizations into a set of comprehensive performance metrics (Kaplan and Norton, 1996, p:2). Based on the results of his research on many organizations, Niven (2003, p:15), concluded that BSC has three main roles as a measurement system, a strategic management system that crystallizes and realizes the strategy, and a bilateral tool for communication that enables the transmission of strategy to all the units and staff from top to bottom and the collection of feedbacks from bottom to top by providing internal communication.

BSC, proven to be worthwhile in profit-oriented organizations, can also be used in educational institutions due to the fact that the focus is on vision and strategy instead of financial indicators (Kaplan and Norton 1992, p:180). In contrast to traditional methods for performance evaluation, BSC examines short-term and long-term results together, makes indepth analyzes on all the dimensions of school vision and establishes cause-and-effect

¹ This study was produced from the author's doctoral dissertation.



relationships between the practices of academic units, creates bridges between the school and the environment as the outer developments will affect the general functioning of the school (Rompho, 2004; Kaplan and Norton, 1992, 1996, 2001), contributes to the individual careers of teachers and school development (Storey, 2002, p:333), allows teachers to appreciate their own role and to behave accordingly as all the staff were charged with the task of implementing the strategy, (Chen et al., 2006, p:203), facilitates the administrators on the procedure of tracking, reporting, and evaluating of school development systematically (O'Neil et al, 1999, p:39).

Strategy maps

Kaplan and Norton (2001, p. 1) indicated that the failure of senior executives to implement strategy stemmed from a false belief about strategy and vision that "*The identification of the right strategy equals to successful implementation of the strategy*" and accordingly the vast majority of executives (70%) argued that the main problem was malpractice, not the strategy itself; however only 5% of employees did comprehend and follow the strategy. It was addressed in the second generation BSC and causal relationships were focused on. The strategy map is a technique that provides a one-page visualized table of the strategic components of an organization and the complex causal relationships between the relevant units to make it more clear, understandable and systematic (Nair, 2004, p:26; Kaplan and Norton, 2004, p:45). The strategy maps complement the gap between strategy development and strategy implementation (Kaplan and Norton, 2004, p:10). Through these maps, the executives will have the opportunity to comprehend their own strategies more clearly, identify possible problems that may arise during implementation and reorganize the plans accordingly while the staff visually grasp the link between their role and the general objectives of the organization.

The purpose of this study was to promote the strategy map proven to be useful for the organizations and to explain the steps of creating a strategy map for an educational organization. Accordingly, the research problem was determined as "what steps should be followed in the process of creating a strategy map in a school?"

Method

It is a qualitative study conducted through "Design Based Research" (DBR) procedure. DBR is a research methodology based on the determination of a set of principles for implementation by researchers and practitioners in a joint study and the amelioration of the specified principles through practice in order to solve a specific problem in real educational environments (Akker et al., 2006:5). Criteria sampling among the purposeful sampling techniques was used to select the school to work with (Patton, 2001). The study was carried out in a private school, in the province of Gaziantep/Turkey with the criterions of adequate working conditions and voluntarism.

Results

The creation of the strategy map depends on the creation of BSC. If an organization has no strategic priorities, the BSC cannot be established, and therefore a strategy map cannot be created before the BSC is established. The creation of BSC consists of 2 phases and 16 steps (Keser Ozmantar and Gedikoglu, 2016). These are *planning phase* (1) Introduction to school, (2) Developing a guiding rationale for BSC needs, (3) Securing managerial support, (4) Forming a BSC team, (5) Unit specification, (6) Developing a training-communication plan; *development phase* (7) Strategic planning, (8) Clarifying the perspectives, (9) Determining



the strategic objectives and priorities, (10)Developing the strategy map, (11) Determining performance measures, (12) Determining target values, (13) Cascading, (14) BSC meeting with the employees, (15) Applying BSC and (16) Conducting regular reviews. The creation of a strategy map is the 10th step of BSC development process. Therefore, the first ten steps in the planning and development phases of BSC development process can be considered as the steps of the creation of strategy maps. The actions carried out within this phase were explained below.

Planning phase

A well-organized plan must be prepared before the strategy map is created. The need for BSC of the school was determined at this step. The support of the top management was granted, working team was made up of managers and the unfamiliar working group was informed about BSC as the procedure causes serious changes in the organizational structure.

Development phase

Strategic planning

Following the preparations in the planning phase, the primary action was the formation of the school strategic plan in the development phase. After 30 meetings with the BSC team, 20-page strategic planning document with strategic aim, strategic objectives, actions, responsible person for the actions, duration, performance indicators and estimated budget was revealed.

Clarifying perspectives

The determination of the dimensions is a very important step in BSC development as strategic goals, objectives and performance indicators will be determined in association with them, and then a strategy map will be created. Although Kaplan and Norton's (1992) framework consisted of four dimensions which are financial, customer, internal processes, learning and development, they were found inconsistent with the strategic needs of the school on which the study was conducted. As they were not suitable for the school, six different dimensions considered to be appropriate to the school's strategy were identified by the researcher. These are the dimensions of satisfaction, student achievement, physical and technological infrastructure, budget management, preferability and image management.

Determining strategic objectives and priorities

The dimensions of BSC are the indicatives of the school's strategy to a great extent. However, what should be done for each dimension in the long run and what kind of a strategy should be adapted to realize the vision of the school have to be clarified before the implementation. The six strategic dimensions and the relevant strategic aims were shown in Table 1. Multidisciplinary Academic Conference

Stratagia dimonsions	Stratagia Aima
Strategic unitensions	Strategic Annis
	1. Ensuring personnel satisfaction
Satisfaction	2. Ensuring Student-Parent satisfaction
	3. Ensuring satisfaction of the founder of the organization
	1. Achievements in national student selection examinations
	2. Development of high level skills in foreign language
Student achievement	3. Adaptation of the innovations in educational programs, methods and
	techniques to the school
	4. Developing artistic, social and sporting skills
Physical & technological	1. Building a campus
infrastructure	2. Adaptation of physical and technological innovations to the school
	1. Increasing incomes
Budget management	2. Decreasing over estimated cost
	3. Creating new resources
	1. School's being preferred by the target group
Preferability	2. The employment of qualified personnel at school
	3. The transformation of competitive elements into superiority
	1. The acceptance of brand positioning
	2. The establishment of a school culture for the cultivation of "Whole
Image management	Person".
	3. Achievements in national-international events
	4. The determination of competition elements

Table 1: Strategic dimensions and the relevant strategic aims

Strategy maps

After the identification of strategic aims, the causal relationships established through strategy maps. The strategy of the school can be more easily communicated to the personnel and it is easier to comprehend as it is presented in a visual form through strategy maps.

In accordance with the raison of foundation d'être of the school, the dimension of satisfaction is the uppermost step of the strategy map. All of the strategies and endeavors are directed to ensure the satisfaction of staff, students, parents and the founder. In addition to different forms of satisfaction, the dimension of student achievement was settled under this theme due to the fact that the present study was conducted in an educational organization. The physical and technological infrastructure needs to be improved for the students to be successful in exams, in arts and sports, in the foreign language, and to adapt new developments in the field of education to the school. The goals of construction of a campus and development of equipment within physical and technological infrastructure dimension depend on financial potential and hence the favorable management of the budget. The management of the school budget will be possible by increasing revenues, reducing costs and creating new sources of income. As the achievement of those aims depends on the school's preferability by the qualified students, parents and staff, the dimension of preference comes after the dimension of budget management. Finally, the school's reaching its target group and promotion of the school as it is desired is relevant with the dimension of image management. That requires the determination of brand positioning, the organization of national / international events, the cultivation of students according to the school motto of "Whole Person" model and the creation of competitive advantage among other schools. The school's strategy map and the relationships between all the strategies are shown in Figure 1.



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Figure 1: The strategy map



Conclusion

As a result of the research, it was possible to present the strategic plan consisting of twenty pages with only one page by means of the strategy map. Thus, the strategy map filled the gap between strategy formulation and strategy execution. According to the philosophy of BSC, 'If you can't measure, you can't manage' and 'If you can't identify, you can't measure.' The strategy maps are used to describe and visualize the strategy (Kaplan and Norton, 2004, p: 13). The visual presentation with the strategy map assisted the staff to realize the strategic connections and to grasp the link between their role and the general objectives of the organization. The potential disruptions were easily recognized and corrected in the phase of the establishment of strategic relationships during the creation of strategy map.

Discussion

The strategy map is a framework that illustrates all the school processes on the same page and consolidates the educational and administrative aspects of the school together. Thanks to this characteristic, the school units can easily notice the interrelationships and communicate with each other (Kaplan and Miyake, 2010, p:13). The strategy map identifies what factors affect student achievement and what they need for success (Sarrico, et al., 2004). Rompho (2004) drew attention to the fact that the map should be developed according to stakeholder expectations while explaining how to create a strategy map. This principle was partially operated during the research to a large extent as the vision and the strategy of the school were determined subsequent to the surveys and interviews with the personnel, parents, students and the founder. Therefore, it can be alleged that the strategy map is formed via the ideas of stakeholders.

The strategy maps are very crucial in the process of BSC. Storey (2002, p:325) highlighted that integrating an enterprise-based framework to an educational organization was even as much essential as the results obtained from the BSC. In this study, a non-education-based strategy map was adapted to a large school with 249 employees and 1426 learners in spite of all the difficulties faced during the research procedure. Some research (Morelad, 2009, p:761; Brown et al., 2008; Chen, et al., 2006, p:203) indicated the significance of the need for the support of top management for the creation of strategy maps and it was also observed during the research procedure. Top management's support is an important and necessary element from the beginning to the end of the study as BSC and strategy maps constitute a management system and bring a great deal of managerial innovations.

The strategy map preparing team, together with the support of top management, had also a major role in accomplishing the implementation. Assari et al. (2006, p:941) emphasized that BSC team should be composed of people from different units of the organization and with high-level qualifications who can easily communicate with top management and other personnel and implement strategic decisions in their own unit. Besides the researcher, the school team comprised of seven academic and non-academic managers with the above mentioned qualifications. Those involved in the process from the very beginning of the study with their invaluable contributions were the Deputy Directors of Finance-Business Administration and Academic Departments, the Assistant Principals of High School and Primary School, the Managers of Human Resources and Public Relations Departments and the Head of R&D Department. Team members from different units made it easier to perform decisions, collect data and report.



Sarrico et al. (2004) reported a difficulty with the understandability of BSC-related concepts in a BSC implementation in a Portuguese high school, but the problem was resolved over time in the forthcoming years. Therefore, BSC was introduced to the school where the study was conducted to avoid similar problems and a series of training on strategy maps were provided. These practices contributed to the establishment of a common language within the school as well as debriefing the staff about the details of the intended study.

Kenny (2003) argues that the four original dimensions of BSC are not suitable for all kinds of organizations and that BSC is not a system that works. However, Kaplan and Norton (1996:44) indicated that these four dimensions cannot be used for all organizations. Six different dimensions were used in the school on which this study was conducted. Five different dimensions (student achievement, stakeholders, processes, learning and development of the staff and financial performance) were used in the first implementation of Kaplan and Lee (2007) in educational institutions. Brown et al. (2008) used four dimensions in their study. However, the dimensions used in their study differed from the original model and they were shaped under the headings of finance, the quality of the school, student performance and academic productivity.

Recommendations

The preparation of strategy maps is a long-term process. It is a requirement for active managers and other personnel to believe in the benefits that the strategy map will provide to the organization and work in a self-sacrificing manner, and the researchers must pay attention to human relationships and communication. As it is a strategy-based approach to prepare a strategy map, it should be bear in mind that the presence of a strategic plan in the organizations where the implementation will be carried out is a prerequisite. It is not possible to apply a specific map to any other school since the strategic priorities of each organization are different from each other. For this reason, practitioners who plan to use the strategy map should create their own maps according to their own strategies. In the following studies, the impact of implementing school strategies, performance evaluation and many other factors can be evaluated through comparing a school using a strategy map and the one without it.

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Biography

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She is an Assistant Professor at the University of Gaziantep, Faculty of Education, in department of Educational Sciences. She did her PhD at educational administration concerned with Performance Measurement System for Schools Based on Balanced Scorecard. Her area of research includes educational leadership, performance management, effective school management, TQM, EFQM, process management and strategic planning. She has several MEd and PhD students working in different areas of financial management, educational evaluation, school effectiveness and teacher development.



Application of English Teaching Materials with Augmented Reality to Language Learners' Vocabulary Learning

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Abstract

International trade plays an important role in Taiwan's economy, and communicating with foreigners fluently in English is the goal of many English learners in Taiwan. Most of them hope to improve their English speaking ability. But the English education from primary school to senior high school in Taiwan mostly just focuses on training for exams. Training students to speak better English is an important challenge that national education authorities, schools at different levels, English teachers, students' parents, and students themselves all Therefore, the purpose of this study is, by the practical English teaching must face. experience, to design and produce a set of memory training materials along with auxiliary aids and A.R (Augmented Reality) App software based on the theory of memory, memory palace techniques, and the basic theory of designing teaching aids, and to use these materials to teach English, thus increasing learners' speaking abilities, their interest in English, and the effectiveness of their education. After teaching and learning from this set of memory training materials and the accompanying teaching aids, teachers and their students provided reviews, ideas for improving the materials, and suggestions for future studies of memory training materials, teaching aids, and App software. The memory training materials, teaching aids, and App software were all successfully created in accordance with the goals of this study.

Keywords: Augmented Reality, Educational Technology, Learning Vocabulary in English Memory Palace Technique, Story Mnemonics.

Main Conference Topic: Educational Games and Software, E-learning, Mobile Applications and Learning (M-learning).

Introduction

As the internet becomes more and more sophisticated, people are able exchange information faster and faster. However, people use different languages in different countries. One of the best strategies is to learn to understand languages other one's mother tongue. English is an international language which is widely used and understood. In order to improve English learners' memorizing and learning abilities, we invented a teaching aid linking puzzles by mnemonics Lenovo, which allows the learner to memorize words and phrases through stories. By using images and texts to complete the jigsaw puzzles, learners may improve their ability to memorize and learn English.

The current study attempts to provide learners with a set of mnemonic learning materials and devices for spoken English, which can enhance learner confidence in English learning, as well as improve language memorization. At the same time, researchers can extend this study by designing and producing spoken English teaching materials for primary students at different levels. Moreover, the mnemonic textbook developed by the study can also be adopted in the establishment of a spoken English oriented Memory Learning Village (an English learning system built surrounding mnemonics). The experimental ideas, teaching



material design processes, and research results of the present study can also serve as a reference for English teachers to develop materials and teaching devices applying memory techniques. These materials have been successfully produced and may be used to teach mnemonics. The main goal of the materials and aids is to heighten students' interest in learning English. We designed the curriculum and materials to emphasize and reinforce visual and auditory learning processes. Through puzzles and graphics applications, learners may enhance their abilities to memorize. Most importantly, learners are able to interact with the learning materials, which improves the efficiency of both teaching and learning. In addition, self-check functions are included in the materials to help learners to remember words and phrases related to the puzzles. Because of my practical teaching experience, accumulated over many years, I very much look forward to using these materials to increase learners' interest and to improve teaching results. This curriculum and these materials may help learners to convert their short-term memories of the curriculum content into long-term memories.

The purpose of this research is to explore the future direction of improvements to English teaching materials. We hope to design better products in order to more efficiently train English learners to improve their English. Innovative materials and effective memoryaiding methods have been combined with new technology such as videos. These professionally designed learning materials allow learners to interact with creative digital teaching materials and teaching aids.

The content of the teaching materials described in this research was selected from various books sold on the commercial market, including books of oral sentences and patterns. The design of the mnemonics curriculum consists of important landmarks of 22 counties or cities in Taiwan, and is supported by the theory of memory and mnemonics. The curriculum may be used along with our patented long-term memory aid, multimedia resources, and A.R. technologies.

Methodology

A. The Memory Palace Technique

The memory palace technique [1-2], also known as the method of loci, is believed to have been created by the Greek poet Simonides of Ceos. According to the story of Simonides, one day, after reading a lyric poem at a banquet, the poet was called out of the feast hall, presumably by two Gods. As soon as he left the hall, it collapsed, killing everyone that was still inside. Given that the bodies were so badly damaged, it was difficult for the relatives to identify them. Simonides, however, managed to recall every single person in the hall based on his memory of the seating arrangements. The key principle of Simonides' mnemonic device lies in our ability to remember the places that we are familiar with. The "memory palace" is merely a metaphor or a symbolic concept, and can be any place that we are familiar with and, hence, can easily recall. A familiar place can be one's home or the route that one takes to work every day; any one of these places can become an important location for us to store and retrieve memories. Since they are places that one may go/pass every day, it requires little effort to recall stored memories. The memory palace technique is one of the most basic and effective methods to quickly recall memories. The only requirement of learners of this technique is repeated practice. When learners master the skill of building their memory palace, they can further extend their practice of retrieving memories.

B. Words Associated with Landmark Numbers

This is a teaching technique that integrates the memory palace and a mnemonic association system, based on numbers, used to develop a memory palace and set of pathways



to visit and retrieve memories. First, a number is assigned to each unique landmark within the county and city in Taiwan where they are found. Next, an associative word is assigned to each number, based on items or objects that the numbers may resemble. For example, the number 1 looks like a pencil; therefore, the associative word for the number 1 can be "pencil." Lastly, stories using the names of these landmarks and the words associated with the number assigned to each landmark are created.

C. Story Mnemonic System

The story mnemonic system involves the creation of stories in English, which can help learners recall English content they have previously learned. One essential principle in composing a mnemonic story is to ensure evocative visualization of the story, through exaggerated, bizarre, unexpected, or extraordinary plots. The protagonist of the story should have exaggerated movements and should interact with the readers. Stimulated by these unusual, exaggerated, and surprising stories, the amygdala, which is located next to the hippocampus in the brain, is activated. The hippocampus deciphers stimuli containing important information and stores them in the frontal and lateral frontal lobes.

If we compare the human brain to a file cabinet, then the process of applying mnemonics to the memorization of learning materials and their subsequent storage in our brain is similar to the processes of categorizing documents with arch files and storing them in a cabinet. In the current study, the arch files were the landmarks of Taiwanese counties and cities, which were utilized to store important information. Then, mnemonics were introduced to help learners memorize a large number of learning materials and increase learner recollection ability and confidence in learning English [3-4].

There are many memorization techniques, including the repetition method, link method, story method, association method, rhyme/phonetic mnemonic method, alphabet system, image method, mnemonic association system for numbers, story mnemonic system, and memory palace technique [5-7]. The present study integrated several mnemonic methods, such as the memory palace technique and the story mnemonic system, into the development of teaching materials and methods with the intention of helping learners memorize key sentences used in spoken English and thereby enhance learning performance. Steps in applying the memory palace technique are as follows:

Step 1. Select a Memory Palace

The first and most important step in developing this structural mnemonic method is to select places that one is very familiar with, such as the city one is living in, the buildings alongside the streets one knows, important shops on the way to work, or famous landscapes and landmarks in one's city, county, or country.

Step 2. List Symbolic Objects

It is important to identify symbolic objects in the location selected as a memory palace.

For example, if one's school has been chosen as the palace, then, the school gate could be one symbolic object, as it is the first thing that one sees when visiting the school. Symbolic objects can be recalled through visualizing the process of visiting the place in reality. Each symbolic object can then be transformed into an important memory cue to store a specific piece of information, or an associative link to a new piece of knowledge, thereby allowing accurate recall of a memory or linkage to new knowledge.

Step 3. Connect Specific Information to New Knowledge and Store Concretely in the Mind

In principle, in order to make the memory palace technique effective, one should make frequent visits to the established memory palace to become familiar with each of the symbolic objects and their associated information. By repeating the aforementioned processes, short-term memories can be effectively converted into long-term memories, learned knowledge can be retained, and new knowledge can be expanded.

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Design of Teaching Devices

In addition to using textbooks of spoken English teaching activities, teachers are encouraged to utilize the teaching devices proposed by this study to help students understand and recall material content. Aside from being able to create a good learning environment for students, an excellent English teacher should be able to apply various teaching techniques (such as teaching methods, designs, and devices).

A mnemonic teaching package includes a memory aid with an image set and augmented reality (AR) [8] application software, both of which are designed to interact with the teaching materials. Multimedia materials are also recommended. The purpose is to promote learners' motivation and learning performance through visual, auditory, and tactile stimuli.

Since English is not the first language of the Taiwanese, some primary school students in Taiwan find it quite difficult to learn. The mnemonic textbook and relevant teaching devices proposed by the present study aim to provide possible solutions to that problem. In order to develop the mnemonic textbook and accompanying teaching devices, we first illustrated the sentences to be taught in the spoken English course into images, wrote mnemonic stories for the images, and compiled the stories and images into a textbook that is designed to facilitate learner interest. Next, we applied the teaching devices alongside the textbook to train learners' spoken English ability, enhancing learning effectiveness.

The mnemonic textbook is composed of 22 units; each unit contains four English sentences and sentence structures designed with specific teaching objectives. Teachers can utilize the textbook and teaching devices to improve the effectiveness of the courses and strengthen learner memory of the knowledge. Moreover, the teaching devices can also help teachers design quizzes, tests, reviews, and final exams in a professional manner.

Instructions for applying the teaching devices with detailed explanations of the design logic and methodology is included in the teaching package, so that teachers can have a better understanding of the design and usage of the devices. With these instructions, teachers will be able to demonstrate the usage of the devices and guide students' learning processes more professionally and skillfully. The textbook and teaching devices were designed to satisfy both teacher and learner needs. The review questions were designed according to the teaching materials, with consideration of memory techniques, operational feasibility, and filing convenience.

Mnemonics Design and Learning Units of the Textbook

The design concept of the system proposed by this study integrated information processing theory, information processing models, and several mnemonics (the memory palace, story mnemonics, and a mnemonic association system for numbers). The experimental products included in the system applied story mnemonics to unique landmarks in Taiwan's cities and counties (the memory palace technique) and associated words for numbers assigned to each landmark, so that learners are able to remember a large amount of the material (key sentences, sentence structures, and extended words in spoken English) at any given time. The teaching material includes 88 sentence structures, 88 sentences, and an additional 526 words derived from these sentences applied to memory techniques. We expect that with the mnemonic textbook and memory aid devices, learners can quickly convert learned language from short-term memories into long-term memories, and effectively improve their English proficiency.



(1)Using Places in Taiwan as Memory Palaces

The memory palace technique is a mnemonic method originating from ancient Greece, and is recognized as one of the most effective memory methods. Guided by the theory of the memory palace technique, the design of the textbook associates teaching content to landmarks of cities and counties in Taiwan to establish a memory palace. Learners are expected to master this memory technique and form long-term memories through repeated training in memory retrieval.

The textbook adopted geographical locations in Taiwan to establish the memory palace. A list of unique street views (landmarks) from Taiwan's counties and cities were adopted as the memory storage locations (the memory palace).

(2)Associating Words with the Landmarks (Mnemonic Association System for Numbers)

The memory palace technique and mnemonic association system for numbers were then incorporated into the textbook in order to design visiting pathways to the leaner's memory palace. At this stage, each landmark was assigned a number, according to its geographical order. For example Taipei 101 (Taipei City) was assigned with number 0, Port of Keelung (Keelung City) was assigned with 1, the Queen's Head in Yehliu (New Taipei City) was assigned with 2, and Turtle Island (Yilan County) was assigned with 3.Next, a word was assigned items and objects that the numbers may resemble, such as assigning "pencil" to the number 1 based on the similar appearance of 1 and a pencil. Then, stories with two protagonists were created, using the landmarks and the associated words.

(3)Applying a Story-Based Mnemonic System

Composing a mnemonic-based story requires vivid visualization of the story via exaggerated, bizarre, unexpected, and extraordinary plots. The protagonists of the story should also have exaggerated movements, as well as interaction with readers. The amygdala in the brain can be activated through stimulation of unusual, exaggerated, and surprising stories. Then, the hippocampus, which is located next to the amygdalae, detects these important stimuli and stores them in the frontal and lateral frontal lobes.

(4)Designing the Memory Aid Device

The memory aid device and the corresponding image sets were designed to stimulate learners with images and words alongside a gamified learning process (a patented design with immediate learning feedback) and thereby help learners convert the materials into long-term memories through repeated memory retrieval processes. There are 88 cards in the image set, representing 88 sentences in spoken English, with an image on one side of the card and an English sentence on the other side. The combination of images and the AR application software provided by the system can create a more interactive learning experience. In addition, the device also serves as a tool for teachers to examine the learning performance of their students.

(5)Designing the AR Application Software

The system developed by the present study is aimed at middle and upper-grade primary school students. The AR application software was designed as a tool to enhance the effectiveness of the memory palace technique, by utilizing images of the mnemonic textbook to generate video materials, so that learners are able to interact with the learning content and thereby enhance their recollection of the content. The application software is easy to operate; learners only need to aim the screen of a mobile device at the images of the learning aid or textbook, then a corresponding video clip will be activated, which is devised to train learners in correct English pronunciation. Utilizing the convenient and easy-to-access features of mobile devices, the AR application software was expected to provide a more effective English learning service to teachers and students, through the combination of a mobile device and printed textbook, thereby improving the overall efficiency of the mnemonic learning material set.



Results

The design concept of the system proposed by this study integrated information processing theory, information processing models, and several mnemonics (the memory palace, story mnemonics, and a mnemonic association system for numbers). The experimental products included in the system applied story mnemonics to unique landmarks in Taiwan's cities and counties (the memory palace technique) and associated words for numbers assigned to each landmark, so that learners are able to remember a large amount of the material (key sentences, sentence structures, and extended words in spoken English) at any given time. The teaching material includes 88 sentence structures, 88 sentences, and an additional 526 words derived from these sentences applied to memory techniques. We expect that with the mnemonic textbook and memory aid devices, learners can quickly convert learned language from short-term memories into long-term memories, and effectively improve their English proficiency.

A. Mnemonic Textbook

With 88 sentence structures, 88 sentences, and 526 extended words of spoken English designed based on the memory palace technique, mnemonic association system for numbers, story mnemonic system, and popular landmarks of Taiwanese cities and counties, the textbook guided learners along the path of their memory palace to memorize key content from the learning materials (essential sentence structures and sentences).



Fig. 1. Mnemonic textbook for spoken English.

B. Memory Aid Device and Image Sets

The memory aid device, with its immediate learning feedback mechanism, image and word stimuli, and gamified operation experience, was able to satisfy the learners' need for achievement, and help them convert learning materials into long-term memories through repetitive training.

C. MP3 CD

The CDs, consisting of 198 MP3 files (with 88 spoken sentences, 22 mnemonic stories, and 526 derived words) helped learners improve their English listening and speaking ability.

D. A4 Application Software

The AR application software provided learners with text, images, and videos that contained important learning information, and created a highly interactive learning environment to learn correct English pronunciation.



Fig. 2. Cards with images are placed on the memory aid device.



Fig. 3. Cards with sentences are placed on the memory aid device.

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Fig. 4. A learner is using the AR application software on a mobile device to interact with a card from the image set.

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Investigation of Elementary School Teachers' Self-Efficacy Perceptions and Frequencies of Usages of Alternative Assessment Methods

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Abstract

The aim of this research is to investigate elementary school teachers' self-efficacy perceptions and frequencies of usages of alternative assessment methods according to their years of teaching, grade and class size. The methodology of the study is qualitative research method and it is conducted on the basis of survey model. The universe of the study is comprised 260 elementary school teachers serving in Silivri-Istanbul in the 2016-2017 academic year. "Self-Efficacy Scale Directed at Alternative Assessment Methods" by Buldu and Tatar (2011) and "Survey of Frequency of Usage of Alternative Assessment Methods" by Kilic (2014) were used as the data collection tools.

The result derived from the research is; elementary school teachers' self-efficacy perceptions on using Alternative Assessment Methods differ based on years of teaching, that self-efficacy perception of the teachers with higher years of teaching is decreasing. Another result is; elementary school teachers mostly use observation, interview and performance evaluation and use Vee diagram, structured grid, diagnostic branching tree and project methods the least often. The teachers mentioned that among the alternative assessment methods they have less knowledge on Vee diagram, structured grid and diagnostic branching tree. Project and interview methods are most widely-known methods by teachers.

Keywords: Alternative assessment methods, self-efficacy perception, elementary school teaching

Main Conference Topic: Learning / Teaching Methodologies and Assessment

Introduction

Developments in science and technology makes the changes in curricula inevitable. In order to bring up individuals in line with the needs of the modern age, up-to-date curricula are based on the approaches to help raise inquisitive and productive individuals who are responsible for their learning, have problem solving skills, can think critically and use technology. Within this framework, a fundamental change was made in Turkish educational system, starting from the 2005-2006 academic year in the primary school; the curricula in accordance with the constructive approach have been implemented gradually. In these curricula, the significance of formative as well as summative assessment was emphasized and presented for the usage of teachers in the assessment of educational process (MoNE, 2005a). The curricula necessitating the usage of such alternative measurement and assessment methods as concept maps, performance and project work, portfolio, self-assessment, check lists together enabled assessment of students' performances in a long-term follow-up, supporting them in the learning environment (Ayas, 2005). Furthermore, these measurement



and evaluation methods contribute to students' better communication, critical thinking and understanding the link with the real life (Waters, Smeaton and Burns, 2004; Karamanoglu, 2006) and provide an opportunity for multiple assessment for students' demonstration of their knowledge, skills and attitudes. Usage of alternative assessment methods supports students' assessment by not only giving a numerical grade but also supporting their learning (Yayla, 2011). According to Lock and Munby (2000), even though changing measurement and evaluation practices present in the system and used for a long term is challenging, alternative assessment approach has been appreciated by educators thanks to their contributions mentioned above (Bay et al., 2010; McAlister, 2000; Nazlicicek and Akarsu, 2008; Tan, 2012). It is of great significance that teachers conduct measurement and evaluation process effectively in terms of enhancing the quality of the quality of education, which could be possible through appropriating alternative assessment approach and its usage correctly.

When the literature is reviewed, there are researches about teachers' opinions regarding their approaches towards alternative assessment (Ozkoparan, 2016; Gomleksiz, Yildirim, Yetkiner, 2011; Doganay, Pinar, 2010; Okur, 2008), their attitudes (Okur, 2008; Kanatli, 2007), the restrictions of these measurement and evaluation approaches Ektem, Keçici, Pilten, 2016; Tuncer ve Ozeren 2015; Bal, 2009; Adanalı, 2008; Kanatlı, 2008; Okur, 2008; Gelbal ve Kelecioglu, 2007). In this study, it is aimed at investigating the elementary school teachers' self-efficacy perceptions towards alternative assessment methods and frequencies of usage of alternative assessment methods (AAM) with respect to various variables. In this context, the sub-goals of the research are provided below.

- 1. Do elementary school teachers' self-efficacy perceptions regarding the usage of alternative assessment methods differ according to their years of teaching, grade and class size significantly?
- 2. How are the frequencies of elementary school teachers' usage of alternative assessment methods according to years of teaching, grade and class size?

Methodology

The study in which qualitative research method is used is of descriptive quality and was conducted on the basis of general survey model. The universe of is comprised 353 elementary school teachers serving in the district of Silivri of the province of Istanbul in the 2016-2017 academic year. It was aimed at reaching the whole universe. However, some of these teachers were not willing to take part in the study and also some of the data collection tools were filled missing; so, there was some data loss and data derived from 295 teachers were included in the data analysis. The distribution of the universe of the study in terms of gender, years of teaching, class size and participation in in-service training was presented in the following Table 1.

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		n	%
Gender	Kadın	185	62,7
	Erkek	110	37,3
Years of Teaching	1-10 yıl	74	25,1
	11-15 yıl	50	16,9
	16-20 yıl	82	27,8
	21- 25 yıl	55	18,6
	25 yıl ve üzeri	34	11,5
Grase	1 st Grade	89	30,2
	2 nd Grade	85	28,8
	3 rd Grade	57	19,3
	4 th Grade	64	21,7
Class Size	25 ve altı	121	41,0
	26 ve üzeri	174	59,0

Table 1.	Distribution	of the	universe	of the	study in	ı terms	of gender	, years o	f teaching	and
				cla	ass size					

"Self-Efficacy Scale Directed at Alternative Assessment Methods" by Buldu and Tatar (2011) and "Survey of Frequency of Usage of Alternative Assessment Methods" by Kilic (2014) were used as the data collection tools. In the original version of "Self-Efficacy Scale Directed at Alternative Assessment Methods" of the 5-likert type and with 26 items, reliability co-efficiency is 0.89. Cronbach Alpha Co-efficiency calculated using the data collected within the scope of the study was calculated as 0.83. "Survey of Frequency of Usage of Alternative Assessment Methods", another data collection tool of the study, consists of 22 items and is of the likert type. Descriptive statistics (frequency, mean, standard deviation and percentage), independent samples T-test, One-Way Anova and LSD post hoc test were used in the analysis of the data obtained from the research.

Findings

The first aim of the research is to investigate the elementary school teachers' selfefficacies towards alternative assessment method and frequencies of alternative assessment methods according to "the years of teaching, grade taught and class size" variables. The findings concerning this aim are provided below respectively.

Teachers' Self-Efficacy Perceptions Regarding their Usage of AAM According to the "Years of Teaching" Variable

		5480 oj 11111	incest uning to t	10015	oj redem	
Years of	Ν	\overline{X}	S	F	р	LSD
Teaching						
1-10 years	74	95,1216	12,53265	3,998	,004	1-10 >21-25
11-15 years	50	99,1400	12,16890			11-15>21-26
16-20 years	82	96,0122	10,89285			11-15>26 up
21- 25 years	55	90,7636	12,39768			
25 years ve	34	91,6176	12,62517			
up						
Sum	295	94,8339	12,26172			

Table 2. One-Way Variance Analysis Results of Elementary School Teachers' Self-EfficacyPoints Regarding their Usage of AAM According to the "Years of Teaching" Variable

Based on the findings presented in Table 2, a significant difference has been determined between elementary school teachers' self-efficacy perception points regarding their usage of AAM according to the "years of teaching" variable [F(4, 290)=3,998, p<.05]. This difference is in support of the teachers with 1-10 years of teaching between those 1-10 years and 21-25 years, while it is in support of those with 11-15 years of teaching between those with 11-15 years and 21-26 years and 11-15 years and 26 years or over.

The usage of alternative assessment approaches became widespread in Turkey together with the beginning to use the curricula prepared in accordance with the constructive approach (MoNE, 2005a; Ozturk and Sahin, 2014) because the curricula prepared with this approach call for the usage of alternative assessment tools in the measurement and evaluation dimension. As seen in the research findings, the teachers whose self-efficacy perceptions are higher with respect to the alternative assessment methods are those using alternative assessment methods since they started their profession. Likewise, Ozenc (2013) determined a significant difference in support of teachers with 1-10 years of teaching in the level of knowledge regarding teachers' alternative assessment methods.

Teachers' Self-Efficacy Perceptions Regarding their Usage of AAM According to the "Grade" Variable

Points Reg	garding their Usa	ge of AAM Accord	ding to the "Gra	ade" Variable	2
Grade	Ν	\overline{X}	S	F	р
1 st grade	89	94,5506	12,80981		
2 nd grade	85	96,2000	12,54022	(0 5	<i></i>
3 rd grade	57	94,9474	10,25813	,695	,555
4 th grade	64	93,3125	12,81477		
Sum	89	94,8339	12.26172		

Table 3. One-Way Variance Analysis Results of Elementary School Teachers' Self-Efficacy

According to the findings presented in Table 3, it has been determined that teachers' self-efficacy points regarding the usage of AAM do not differ according to the grades in which they teach (p > .05). Bagci (2011) also mentioned that elementary school teachers' usage of alternative assessment techniques does not differ significantly according to grades in which they teach, which could result from teaching their students starting from Grade 1 and having them graduate in Grade 4 and so teaching in a different grade every year. The teachers teaching in different grades may lead to the development of self-efficacy perception, getting to know and using these alternative assessment methods included in every ever grade's curricula.

Teachers' Self-Efficacy Perceptions Regarding their Usage of AAM According to the "Class size" Variable

Table 4. Independent Samples T-Test Analysis Results of Elementary School Teachers' Self-Efficacy Points Regarding their Usage of AAM According to the "Class size" Variable

Class Size	Ν	X	S	sd	t	р
25 and less	121	96,239	12,370	293	1,647	,101
26 and more	174	93,856	12,124	254,960		

As seen in Table 4, there is no significant difference between teachers' self-efficacies regarding their usage of alternative assessment methods (p<.05). When the other researches in the relevant literature are reviewed, it is seen that the researches concerning the class size mostly focus on the challenges encountered in the usage of alternative assessment methods. There are findings that teachers stand out as an obstacle for the usage of alternative assessment methods in crowded classrooms in these studies (Gelbal and Kellecioglu, 2007, Anil ve Acar, 2008; Demir, Ozturk, Dökme, 2011; Tuncer and Ozeren, 2015;Ektem, Kecici, Pilten, 2016).

Then, elementary school teachers' frequencies of usage of alternative assessment methods according to the years of teaching, grade and class size at the second stage of the research. The findings regarding this aim are presented below respectively.

Teachers' Frequencies of Usage of AAM According to the "Years of Teaching" Variable

When the data derived from the research was analyzed in terms of the professional years of teaching, it was determined that the teachers with 1-10 years of teaching experience mostly use the observation method (32%), those with 11-15 years (62%, 52%) and those with 16-20 years (51,2%, 36,6%) use the observation and interview methods in the frequency of "always" with the highest percentage. While the teachers with 21-25 years of teaching only use the observation method (45,5%), those with 26 years or more years of teaching make use of the observation (52,9) and performance assessment methods in the frequency of "always" with the highest percentage.

In the frequency of "never", it was determined that the teachers with 1-10 years of teaching do not use Vee diagram (31,1%) and structured grid (28%) with the highest percentage; those with 11-15 years of experience, Vee diagram (22%), those with 16-20 years of experience, projects (42,7%), those with 21-25 years of experience, again projects and those with 26 years or more, Vee diagram (20%). Moreover, it is seen that teachers with all ranges of years of experience have no knowledge about Vee diagram and structured grid with the highest percentage. The teachers with 1-10 years of experience are more aware of Vee diagram (18,9%) and structured grid (18,9%) than those with more years of experience.

Teachers' Frequencies of Usage of AAM According to the "Grade" Variable

In the findings derived based on teaching in various grades, it has been determined that, in the frequency of "always", 1^{st} grade (49,4%) and 3^{rd} Grade (38,6%) teachers use observation with the highest percentage and 2^{nd} Grade teachers use observation (55,3) and interview (37,6) methods. Then, 4^{th} Grade teachers use performance evaluation method (35,9%) as well as observation (42,2%) and interview (40,6%) methods.

Then, in the frequency of "never", it was determined that 1^{st} grade teachers do not use project (22,5%), diagnostic branching tree (20,2%) methods, 2^{nd} grade teachers; Vee diagram (31,8%) and project (29,4%) method; 3^{rd} grade teachers, structured grid (24,6%) and 4^{th} grade teachers also Vee diagram (21,9%) method. What's more, the teachers in any grade stated that they did not have knowledge about Vee diagram and diagnostic branching tree with the highest degree, respectively.

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Teachers' Frequencies of Usage of AAM According to "Class Size" Variable

When the findings are analyzed according to the "class size" variable, it was determined that the methods the teachers with more than 26 or more students use in the frequency of "always" are observation and interview (35,1%), whereas those of the the teachers with 25 or fewer students is only observation (45,5%).

The teachers with 26 or more students are unaware of Vee diagram (32,8%) and structured grid (28,7%) with the highest percentage and the teachers having knowledege about the methods do not use Vee diagram (20,7%) and diagnostic branching tree (20,1%) with the highest degreee in the frequency of "never". On the other hand, the teachers with 25 or fewer students, in the frequency of "never" do not use Vee diagram (28,1%) and diagnostic branching tree (27,3%) with the highest degreee. These teachers as well as those with 25 or fewer students are not knowledgeable about Vee diagram (33,9%) and diagnostic branching tree (33,1%) with the highest percentage.

When the other researches in the relavant literature are reviewed, it is striking that observation is also the method that they would like to plan to use often and that they plan to make use of portfolio, performance assessment, concept maps and concept cartoons frequently (Oren, Ormanci and Evrekli, 2014). Then, Ozenc did not mention observation and interview methods among elementary school teachers of ten use, whereas he mentioned they often used performance assessment, porftolio, project and self-assessment.

Similarly, Karamustafaoglu, Caglak ve Meseci (2012) expressed that structured grid and diagnostic branching tree methods are seldom used by teachers, which is in line with the findings of the study. In addition to these methods, Celikkaya, Karakus ve Demirbas (2010) determined that teachers did not prefer using observation forms, self-assessment, peer-group assessment, research report and interview type of alternative assessment methods. Then, Topbas (2011) mentioned the project method as the one teachers do not attach enough significance as a method.

Additionally, in line with the findings obtained from those from the research, Karamustafaoglu, Caglak ve Meseci (2012) concluded that teachers do not consider structured grid and diagnostic branching tree methods as sufficient. Tuncer and Ozeren (2015) determined some finding that how Alternative Assessment Methods should be used in general in more than 70 studies in their meta-analyis study. Besides, there are researches showing that teachers regard themselves as incompetent in the usage of alternative assessment methods generally (Gelbal ve Kellecioglu, 2007; Arslan, Kaymakcı ve Arslan, 2009; Coruhlu, Naz, Cepni, 2009; Ozenc, 2013; Tuncer and Ozeren 2015).

Results and Suggestions

It was determined that elementary school teachers' self-efficacy perceptions differ based on years of teaching, that self-efficacy perception of the teachers with higher years of teaching is lower than that of novice teachers.

Another result derived from the research is that elementary school teachers mostly use observation, interview and performance evaluation respectively and Vee diagram, structured grid, diagnostic branching tree and project methods the least often. The teachers mentioned that among the alternative assessment methods they have less knowledge are again Vee diagram, structured grid and diagnostic branching tree. Project and interview methods are most widely-known methods by teachers.

In this study, the elementary school teachers' self-efficacy perceptions towards the usage of alternative assessment methods and their frequencies of usage of these methods. Self-efficacy perception of branch teachers could be studied in further studies. Moreover, to what extent they use alternative assessment approaches are used correctly and effectively is suggested another topic to be studied.

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The Effect of Self-Reflective Journaling on Long-Term Self-Efficacy of EFL Student Teachers

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Abstract

Reflective teaching is a means of professional development which begins from our classrooms. While there have been so many reflection investigations in the contemporary studies, the territory of teacher's own development, generally known as "self-efficacy" needs more empirical exploration. The main purpose of this study was to characterize the effect(s) of specific self-reflective practices, namely journaling, on the student teacher's self-efficacy within four- and eight-month courses. Research on Cognitive-Behavioral Therapy (CBT) has shown that journaling has a positive impact on individuals' self-growth and intrapersonal characteristics. In this study, it was attempted to empirically determine the effects of reflection in general and reflective teaching in particular on the self-efficacy of the student teachers. A total of 114 student teachers, 26 males and 88 females who majored in TEFL at Teacher Training University, Sananadaj Branch in northwestern Iran, were randomly chosen as the participants. A mixed-method research design was used and data were collected through self-reflection and self-efficacy scales, and also reflective journals. Hattan and Smith's (1995) model was used to analyze journals. The findings demonstrated developmental changes in student teacher' sense of efficacy and also they could hold the majority of reflection attributes for long time after experiencing the treatment.

Keywords: Journaling, Self-Reflection, Long-Term Self-Efficacy, Student Teacher **Main Conference Topic:** Academic Conference on Education, Teaching and E-learning

Introduction

Reflection is typically understood as what allows us to learn from experiences either personal or impersonal by thinking back on them. *"Experience plus reflection equals growth"* Dewey said (1933). Thus, reflection cannot be a passive and linear concept in its nature, but a dynamic and multidimensional process to be adopted by the novices in hope of better and more sophisticated actions. Moon (1999) puts it in this way "a set of abilities and skills, to indicate the taking of a critical stance, an orientation to problem solving or state of mind" (p. 10).

Mewborn (1999) argues that there is no common definition for reflection, and different researchers take into account different facets of it. Hence Dewey has been a base for many researchers and writers to develop their own definitions for reflection. Reflection is of special relevance to teacher education, as it encourages teachers to integrate theory with meaningful and tangible practice, gives them an opportunity to appreciate their own competence, and turn every experience into a new potential learning situation and further growth. Reflective



teaching can be considered as thinking back at what the teacher has done during the teaching course in the classroom, re-thinking about why it has been done and what its immediate reasons are, and finally figuring out and analyzing what consequences it may have and whether it works, and in case of its failure, seeking an appropriate alternative behavior of teaching; i.e. so-called "a process of self-observation, self-evaluation, and finally self-improvement".

Human has the power of putting his thoughts into action. Meanwhile this process of learning and its opportunities must be used as bridge-buildings between thinking and doing. By so doing, human is capable of identifying and exploring his own practices, beliefs and methodology in a detailed way. This process may lead to some biased judgments and it is why Bandura (1997) suggests that it must be reviewed at least once in third person's point of view. Ultimately it may happen to bring some changes and improvements in teaching. Therefore reflective teaching is a means of professional development which begins from our classrooms. In fact, Bandura (1997) believes that how people behave can be better predicted by the beliefs they hold about their potential capabilities, what he calls 'self-efficacy beliefs', than by what they are actually capable of doing, because these self-perceptions are of great help for crystalizing what individuals do with/without the knowledge and skills they have.

In teacher education programs, activities which seek to develop a reflective approach to teaching aim to develop the skills of considering the teaching process thoughtfully, analytically and objectively, as a way of improving classroom practices. Moon (1999) asserts: "In education, the main interest in reflective practice has come from teacher education more than those engaged in teaching, or who are concerned about learning..." (p. 57). "The focus on students' self-beliefs as a principle component of academic motivation is grounded on the assumption that the beliefs that students create, develop, and hold to be true about themselves are vital forces in their success or failure in school" (Pajares, 2003, p. 140).

6. 7. In spite of worldwide changes in teaching and drawing it into a more thoughtful and effective practice for teachers as well as students, the act of self-reflection and the construct of self-efficacy still remain matters of course books and articles for a quite great number of student teachers. According to Henson (2001) although the concept of self-efficacy is theoretically well-grounded, much more empirical work and model testing is required to explore its foundations in a comprehensive way (as cited in Egel, 2009). Fisher (2010) confirms this lack of experimental grounded studies and adds that there is no empirical evidence on the change in professional self-efficacy during training programs, even though Bandura (1977) emphasizes that there could be a change in one's self-efficacy over the years. On the other hand, journal writing is advocated in facilitating reflection and theoretically approved, yet little has been done about its magnificent role in enhancing the sense of efficacy in student teachers.

Although within a short history, self-efficacy has been classified and divided into different categories and/or with different names, its general understanding orbits around the same construct of efficacy. In the present study, Yavuz's (2010) taxonomy of self-efficacy with three dimensions was used for its clearly cutout sketch includes; *Classroom Management* (CM) (Milner, 2002; Gibson & Dembo (1984), *effective use of Instructional Strategies* (IS) (Ross, 1998; Gibson & Dembo, 1984), and *capabilities of teacher for Student Engagement* (SE) (Tschannen-Moran & Woolfok, 2001; Purzer, 2011).



The main focus of this study was to characterize the effect(s) of specific self-reflective practice, namely journaling, on the student teacher's efficacy within a specific period of time from the perspective of Bandura's Social Cognitive Theory (1986). Recently, reflective journaling has been used to emphasize and connect teaching with thought process and self-awareness. "Research on Cognitive-Behavioral Therapy (CBT) indicates that journaling can have a positive impact on individuals' self-growth and intrapersonal characteristics" (Fritson, 2008, p. 75).

Related work

Epistemological Beliefs

No true definition of journal writing has been introduced to literature due to the indefinite number of ways journal writing can be applied in quite various situations. Actually, in the literature, journal writing has been described and explained in many different ways. Moon (2003) brings some these definitions to figure out the essence of journal writing as well as some purposes and problems for doing so. Like others, she names learning journals as a vehicle for reflection.

Schön declares that writing about experiences is a useful tool for reflection, because it enables people to make explicit the knowledge that is implicit in their actions (1991). Rowls and Swick (2000) report the effects of reflective journal writing on teacher development as providing new developmental information to the teachers participating in their study:

I really gained a better perspective about relating to children different from me ... I realized I was trying to see the children within one mental framework--mine! Now I can see that each child comes from a unique position in life. (p. 463)

8.

9.Holly (1989) defines differences between a log, diary, and journal. A log is a record of information that is a highly structured, factual account maintained over time. A diary is a daily record of personal experiences and observations in which thoughts, feelings, and ideas are expressed (as cited in Pesut, 2012, p. 11). Pesut (2012) claims that "a journal combines the objective aspect of the log with the personal aspect of the diary" (p. 11).

10.

11. Journaling can have many different applications based on the goals of the instructor and students. Refern (1995) recommends writing for four reasons: 1) thoughts can be transferred onto paper for examination and analysis in a less personal, more objective way; 2) the process of constructing words and sentences in one's head before being committed to paper enables thoughts and recollections of events to be given a certain degree of structure; 3) it provides a permanent record of professional practice, which can be used to gain further insights at a later date; and 4) writing shortly after the event provides a more accurate account of the event (as cited in Pesut, 2012).

For the purpose of this study, journal writing referred to any writing that student teachers undertook after the classroom experiences and taking into account whatever positive and negative teaching experiences and techniques they encountered or applied in the classroom; whether reinforced or blocked students learning and that challenged them to reflect on. It equally considered how the participants might perform similarly or differently in similar situations which arise in the future.



Although it might take a long time to possess such a great competence and sophistication, student teachers were continuously helped by either the researcher or the university instructors to succeed in making this ordeal possible. It was heavily emphasized that the procedure of any journal writing assignment for teachers should be directly in line of students' satisfaction with both the class activities and their improvement.

Having two universally accepted models of theory, i.e. Social Cognitive Theory for exploring the gigantically expanded world of self-efficacy and Social Constructivist Theory for studying reflection in its fundamental sense, the researchers were able to categorize all their findings in a discernible way. Thus, based on the most epoch-making definitions, questionnaires, and techniques and also keeping pioneers' ways of research in this area into consideration, the researchers attempted to fulfill the purpose of the study. With this background on self-reflection and in line with determining types of effect(s) student teacher's practices of self-reflection may have on their level of self-efficacy, the following null hypotheses were determined to be dealt with;

- 1. Self-reflective practices (in here, journal writing and follow-up discussions of the student teacher) in/on the classroom don't influence teacher's level of self-efficacy.
- 2. Practicing in reflective activities for a four-month course of action can't helps the student teachers to improve their long-term sense of doing self-reflection.

Model

Participants

All 114 participants were junior or senior TEFL students and at the time of the study were in the last year of their four-year English bachelor course during fall 2012 semester in Humanities Faculty at Teacher Training University, Sananadaj Branch. Of this randomly selected sample, 64 were put in the experimental group and the rest in the control group. Demographic form was filled by the participants. Sample participants ranged in age from 21 to 42, and by excluding just 5% all were in their twenties.

At the time of the study, the participants were all nominated teachers in specific junior high schools. They were all TEFL students and, therefore, they had to cover the prescribed TEFL curriculum developed throughout four years of study, including approximately 6 months of practicum in senior/junior high schools as apprentices or teacher assistants, which was distributed over the second and the third years, namely teaching practicum 1 and 2.

1.2 Instrumentation

In this study, following instruments were administered to collect both quantitative and qualitative data on the student teachers and their students.

3.2.1 Teacher Self-Efficacy Scale. "Teacher Self-Efficacy Scale" (TSES) developed by Bandura (2006) with Cronbach's alpha of .81, which was designed to help teachers and teacher trainers to gain a better understanding of their present situation in their classrooms and to obtain self-efficacy perception scores from both the student teachers and their students, was used to test the first hypothesis and assess self-efficacy progress and the productivity of the critical thinking on the part of the student teachers. It consisted of 28 items, six subcategories which were answered on a 100-per cent range to examine self-efficacy components, i.e. CM, IS, and SE; from 'cannot do at all' to 'moderately can do' and finally to

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'highly certain can do'. Its subcategories made it possible to classify them under the three dimensions of Yavuz's (2010) taxonomy of self-efficacy.

Six subcategories of the scale were as follow; Efficacy to Influence Decision Making, Disciplinary Self-Efficacy, Efficacy to Enlist Parental Involvement, Efficacy to Enlist Community Involvement, which can be classified under the *Classroom Management* dimension; Instructional Self-Efficacy under the *Instructional Strategies*, and Efficacy to Create a Positive Climate under the *Student Engagement*.

3.2.2 The Reflective Teaching Scale. The second scale used to evaluate the student teachers' actual reflective teaching practices was devised by Akbari et al. (2010) for the first time in Iran. It followed the standard outlines for questionnaire development introduced by Brown, 2001 and Dornyei, 2003, which was limited within a module of 5-point Likert scale ranging from "always" to "never" to assess English language teachers' recourse to reflective practice. It was used to assess the amount of reflection practices among teachers to test the second hypothesis of the present study. It includes indispensable subjects in reflection such as; classroom experiences and observations, portfolios, discussions (teacher-teacher and teacher-student), reading articles and books, workshops and conferences, and ultimately reflections and its societal consequences. Cronbach alpha reliability of the questionnaire was estimated to be .91 by its designers while it was calculated **.**78 in the context of this study.

3.2.3 Journal Writing in which student teachers wrote about their teaching success and failure experiences, unexpected situations, consequences of applied techniques in class, and teacher-and-students feelings. Later in their group discussions, they used these descriptive notes to review their classroom activities.

All journals during this period were collected once every two weeks and then regarding writing principles of journal writing, they were corrected and necessary feedbacks were given on their writings, and they were discussed. Beside oral reminders, they got informative correcting notes on their teaching. This was possible through reading their journals and prudent feedback.

Hatton and Smith's model of writing styles (as cited in Taggart and Wilson, 2005, p. 3) was used to analyze journals and group them into four styles of writing; *Descriptive Writing*, *Descriptive Reflection*, *Dialogic Reflection*, and *Critical Reflection*.

3.3 Briefing

3.3.1 How to Teach English. In each session, it was tried to briefly include some teaching techniques and strategies from "How to Teach English" book, Harmer, 2007. It was of great inspirations for student teachers and in addition to their own techniques in real classroom, the most prominent strategies of this source were briefly and clearly discussed.

3.4 Procedure

A sequential mixed-method approach was used in the present study to account for both theoretical and empirical aspects of what influence reflection practices might have on the student teachers' self-efficacy and hence help to create a more realistic milieu for developing reflection, on the one hand, and enhance collective and individual self-efficacy, on the other.

In existing literature these two general variables, i.e. reflection and efficacy, are theoretically proved to be undeniably woven into each other (Bandura, 1989a; Cook, 1998; Kirby, 2009; Fritson, 2008; Pajares, 2003). Thus the present study put more emphasis on the



experimental practice of this idea. This aim was achieved through the use of reflective activities as the conducted treatment and two scales which are described below.

3.4.1 Instruction. A total of 114 student teachers (32 males, 28.07% and 82 females, 71.92%) succeeded in passing IELTS test and showed their tendency to follow the study. Before engaging student teachers in the treatment, self-efficacy and self-reflection of both the experimental and the control groups were tested through the scales as pretests to be later compared with those as posttests. To start the treatment of the study, a university instructor clarified all possible aspects of reflective practices and typical model situations in classroom. In these two sessions, various types of journaling were practiced and their processes were observed directly by the student teachers. This two-session instruction on how to write journals triggered the experimental group for a four-month course of action while the control group experienced none of the reflective activities.

3.4.2 Contribution and Confidentiality. Three classes, two senior classes and one junior class, were determined as the experimental group (a total of 64 participants; 51 females, 79.68% and 13 males, 20.31%) and the other three classes, with the same proportion of senior and junior classes as the experimental group, were chosen as the control group (a total of 50 participants; 37 females, 74% and 13 males, 26%). This specification of classes was achieved through close consultation with teaching faculty administrator at the university.

However, only those student teachers who signed consent form were considered as the participants of the study. As such their participation was all voluntary though all of them agreed to be part of this study. Furthermore, it was clarified and reminded during the treatment course that their responses and written journals would be all confidential and only used for the research purposes. To ensure them about confidentiality, their information was kept anonymous. A three-letter code was given to each of them (e.g. Student # 061) up to the end of the study and they were only supposed to write their codes on their portfolios.

3.4.3 Body of the Treatment. In order to brainstorm as many reflective ideas as possible and trigger a sense of reflection and for more inspirations, the experimental group was provided with a collective list of reflective thinking attributes (Appendix B) prepared by Taggart and Wilson (2005, p. 37).

Every other week experimental student teachers handed their journals to the researcher. Their journal writings were classified under "Four Writing Styles" model proposed by Hatton and Smith (1995); First, *Descriptive Writing* which was not considered as a reflective one and only describe the process of activities; Second, *Descriptive Reflection* focused on experienced-based justification of events; Third, *Dialogic Reflection* which tried to judge the event justly and from multiple perspectives; and Forth, *Critical Reflection* which scrutinized the event with a connection to multiple contexts such as pedagogical.

This procedure lasted for four months and thus the researcher succeeded in collecting eight series of journals. Reflection, to put it into a realistic framework, was tested three times, i.e. as pretest, posttest 1, and in the eighth month from the beginning of the treatment, posttest 2 so as to be longitudinally tested. The second posttest was specially acclaimed since its result showed long-lasting effect of self-reflection.

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Implementation

These findings have several significant implications for both teacher training programs and the Ministry of Education. While the former directly addresses teachers and tries to prepare these new appointees for the real application of their achieved faculties, the latter mostly focuses its attention on the students in the educational system and the maximum growth of their talents. Although concerning these qualities and their potential benefits to a healthy system is inevitable, Iranian educational system is yet to develop a more accountable operational working engine for this ordeal in its schools.

Results

Investigation of Hypothesis I

In order to elaborate on the first hypothesis which emphasizes that "Self-reflective practices in/on the classroom do not influence teacher's level of self-efficacy", data were collected from participants in two phases and illustrated in this section. Table 4.1 illustrates collected descriptive statistics (both measures of central tendency and measures of variability) for the experimental and control groups from Bandura's Teacher Self-Efficacy Scale (2006). It was administered to a group of student teachers and the result of Cronbach Alpha was .81 for this scale. Each of the twenty-eight items in the scale ranged from 0% to 100% and the participants were supposed to give their answers to each item in this range.

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Group	N	Range	Minimum	Maximum	Mean	Median	Mode	Std. Deviation	Variance	Std. Error Mean
Experimental	64	35	56	91	68.95	69.00	68	6.124	37.506	.76552
Control	50	19	61	80	68.48	74.00	Mode	4.635	21.479	.65543

 Table 4.1 Descriptive Group Statistics of Self-Efficacy in Pretest (H1)

Table 4.1 shows that the general mean score for self-efficacy among the experimental group of student teachers was 68.95 in their pretest, which was comparable to that of the control group, i.e. 68.48. This fact shows that both of them were chosen from almost a similar and homogenous population with almost the same perception of efficacy.

Table 4.2In	dependent Samples	T-test for Comparing	Self-Efficacy a	of Two Groups
in the Pretest	(H1)			

	Leven for E of Va	e's Test quality riances	t-test for Equality of Mear					ns		
				95% Confidenc Interval of the Difference						
	F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	Lower	Upper	
Equal variances assumed	.989	.322	454	112	.651	47313	1.04228	-2.53827	1.59202	

To run T-test for the comparison of the means of the experimental and control groups, two assumptions of equality of variances and normality should be met. Equality of variances in this hypothesis is supported because the P-value in Levene's Test, shown in Table 4.2, is .32 which is higher than the critical value of this test, i.e. $\alpha = .05$. In statistics, Levene's Test is an inferential statistic used to assess the equality of variances in different samples.

As it is clear from the statistical findings presented in Table 4.2 for T-test, Sig level which is .65 is greater than .05. Besides, the t-value which is .45 is lower than the t-critical (1.98). So it does not show any significant difference in calculated means of two groups.

Therefore, it can safely be claimed that the control and experimental groups are not statistically different in their pretest.

It daresay the equality of self-efficacy among both the experimental and control groups is the main reason for justifying their pretest of the first hypothesis.

Group	N	Range	Minimum	Maximum	Mean	Median	Mode	Std. Deviation	Variance	Std. Error Mean
Experimental	64	34	60	94	78.48	79.00	79	7.076	50.063	.88444
Control	50	30	61	91	73.38	74.00	76	6.350	40.322	.89802

 Table 4.3 Descriptive Group Statistics of Reflection in Posttest (H1)

Table 4.3 manifests this fact that the general sense of self-efficacy in both groups of student teachers has improved during the action course of this study, but differently. This enhancement is to a great extent in reflection practices' debt, though the general presence of activities in the language department for sure affected the student teachers in both groups and unintentionally fueled the process.

In order to compare the mean scores of posttest in both the experimental and control groups, first the Levene's test is used to determine the equality of variances and to show that the data are homogeneous. Then T-test is used to determine the difference/equality of the means.

in 1 osnesi (11	1)								
	Levene for Equ Varia	e's Test ality of ances			t-te	est for Equal	ity of Mean	S	
				95% Co Interva Diffe					
	F	Sig.	t	t df tailed) Difference Difference					Upper
Equal variances assumed	.072	.789	-3.996	112	.000	-5.10438	1.27737	-7.63532	-2.57343

 Table 4.4 Independent Samples T-test for Comparing Self-Efficacy of Two Groups in Posttest (H1)

As it is shown in Table 4.4, the equality of variances is achieved because the P-value is .78 which is higher than $\alpha = .05$. Table 4.4 also provides enough criteria for the rejection of the first hypothesis, because P-value which is .000 is less than .05 (Sig< α). So it shows meaningful difference between the experimental and control groups in their posttest. Furthermore, the observed t-value, i.e. 3.99, is more than the critical t-value at the .05 level of significance (1.98). These numbers might be vitally important for teacher education programs.

Considering the primary homogeneity of two groups and in the light of statistical data resulted from the applied treatment in this study, it is obviously shown through Table 4.4 that a considerably meaningful difference has been observed between the experimental and control participants in their posttest.







Figure 4.1 Mean Bar Graph of Student Teachers' Self-Efficacy of Two Groups in Posttest (H1)

Therefore, the first null hypothesis which states "Self-reflective practices in/on the classroom don't influence teacher's level of self-efficacy" is rejected.

4.2 Investigation of Hypothesis II

The second hypothesis which claims that "Practicing in reflective activities for a fourmonth course of action cannot help the student teachers to improve a long-term sense of practicing self-reflection" is elaborated in this section using "The Reflective Teaching Scale" developed by Akbari, R. et al. (2010). Authors claim that the Cronbach Alpha reliability of the questionnaire was estimated to be .91 while it was found .78 for the context of this study. This questionnaire composed of three parts with 29 five-point-Likert-type scale items. In order to scrutinize the similarity between two groups in their pretests, their descriptive statistics (both central tendency and variability measures) is provided in Table 4.5.

Group	N	Range	Minimum	Maximum	Mean	Median	Mode*	Std. Deviation	Variance	Std. Error Mean
Experimental	64	30	75	105	88.13	87.00	84 ^a	6.280	39.444	.78506
Control	50	40	70	110	90.08	90.50	91 ^a	7.706	59.381	1.08978

 Table 4.5 Descriptive Group Statistics of Reflection in Pretest (H2)

*a. Multiple modes exist.

Although the experimental mean was counted 88.12 and the control mean was calculated 90.08 for the pretest, the overall enhancement of reflection in the experimental participants was so significant that compensated this trivial difference. Furthermore, Sig (p-value) proved the equality of means.

()											
	Levene for Equa Varia	's Test ality of nces			t-te	est for Equal	lity of Mean	s			
								95% Co Interva Diffe	95% Confidence Interval of the Difference		
	f	Sig.	Т	T df tailed) Difference Difference Low							
Equal variances assumed	.522	.472 1.492 112 .138 1.95500 1.309946404							4.55048		

 Table 4.6 Independent Samples Test for Comparing Reflection of Two Groups in

 Pretest (H2)

To run T-test for the comparison of the means of the experimental and control groups, two assumptions of equality of variances and normality should be met. Table 4.6 shows that the variance of the two groups is equal since the Sig level for Levene's Test is .47 which is higher than $\alpha = .05$. Calculated Sig (P-value) which is .13 is higher than the critical value, i.e. .05 and in addition the t-value which is 1.49 is lower than the t-critical (1.98). So the mean values of two experimental and control groups did not show any meaningful difference. Therefore, it can be aptly claimed that control and experimental groups were not statistically different in their pretests.

This general homogeneity among the student teachers was greatly due to this fact that they were all university students and from almost 21-23 years of age at the time of the study. Demographical information of them made it clear that not only the majority of them had the same age, profession, and beliefs, but also, as it became clear here, their general sense of reflection was enormously similar. For comparing both samples in the posttest, Wilcoxon Mann-Whitney Test which as a nonparametric T-test is used since the normality assumption is questioned and scores among the experimental participants are not normally distributed.

Group	Ν	Mean Rank	Sum of Ranks	
Control	50	46.24	2312.00	
Experimental	64	66.30	4243.00	
Total	114			

 Table 4.7 Mann-Whitney Test of Student Teachers' Ranks for Reflection in Posttest (H2)

Table 4.7 shows student teachers' ranks when Mann-Whitney test was run. Student teachers ranking shows a considerably great difference between the two groups in their posttest.

 Table 4.8 Test Statistics for Two Groups in Posttest (H2)

	Posttest (H2)
Mann-Whitney U	1037.000
Wilcoxon W	2312.000
Z	-3.224
Asymp. Sig. (2-tailed)	.001



Difference between mean ranks of two groups is also supported in Table 4.8 since Sig level is .001 which is quite less than .05 (Sig $<\alpha$). Therefore the second hypothesis which reads that "Practicing in reflective activities for a four-month course of action does not help the student teachers to improve their permanent sense of doing self-reflection" is conclusively rejected.

Group	N	Range	Minimum	Maximum	Mean	Median	Mode	Std. Deviation	Variance
Experimental	64	41	86	127	99.00	97.50	98	8.801	77.460
Control	50	38	80	118	94.00	94.00	98	8.036	64.571

 Table 4.9 Descriptive Group Statistics of Reflection in Posttest (H2)

This is also shown through Table 4.9 which clarifies that a difference of exactly 5 points has been observed between two groups' mean scores after experiencing applied treatment in this study. This number increased to about 7 points when the overall reflection of two groups during the whole process of the study was taken into account.

This newly rejected acclaim of hypothesis 2 is also clearly illustrated in Figure 4.10 with a close enquiry into means of both groups in their posttest. This fact makes it clear that the experimental student teachers have gained a higher tendency toward self-reflection and its rehearsal.



Figure 4.2 Mean Bar Graph of Student Teachers' Reflection of Two Groups in Posttest (H2)

As it is clear from the statistical data gathered on pretest and posttest 1 of the experimental group, a meaningful difference of about 11 points was observed between these two phases and hysterically purified the effect of the treatment. Four months later posttest 2 was given to the same experimental group to investigate the durability of the treatment. Figure 4.3 illustrates calculated means for pretest, posttest 1, and posttest 2 of the experimental group.

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Figure 4.3 Line Graph of Student Teachers' Reflection in Posttest 1 and Posttest 2 of Experimental Group

Although the difference shown in figure 4.3 is much less than the observed improvement during the four-month of action course, it shows a nonstop progress in their reflection.

Table 4.11 manifests that there is a significant difference between posttest 1 and posttest 2 since Sig level is .001 which is lower than .05 (p-value $<\alpha$) and t-value which is 3.38 is

	Paired Differences							
			Std.	95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Error Mean	Lower	Upper	t	df	Sig. (2- tailed)
Pair 1 Experimental G. in Posttest 1 Experimental G. in Posttest 2	-1.922	4.544	.568	-3.057	787	-3.384	63	.001

 Table 4.11 Paired Samples Test for Experimental Group in Posttest 1 and 2 (H2)

higher than t-critical (2.00).

Therefore, statistical data gathered throughout the process of this study suggested that reflection can be included in teacher education programs so as not to forget about the quality of teaching. Reflection data analysis here showed that student teachers as well as novice, preservice and in-service teachers are potentially in favor of reflective strategies and can hold the majority of reflection attributes for a long time after experiencing a reflection treatment. As one of the participants in the research stated "The reflection introduced here (during the study) inspired me a chance to stop and think about my goals and students. It helped me with impromptu situations about my classes, grades, students, and teaching. I think reflections should be added to the list of 'College Syllabus."

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Conclusion

The primary practical purpose of the present study spurred from this question that whether student teachers can get their adequate level of efficacy using self-reflective practices. This adequate level was defined to be close to that of well-accepted professional teachers. This purpose was defined as "to evaluate whether reflective journaling could be taken into account when the aim is to improve self-reflection and learning from self-reflective activities in its initial step and also to enhance the level of self-efficacy in student-teachers in real classroom situation." In the literature, it has been theoretically agreed upon that reflection is one of the indispensable criteria influencing the level of efficacy.

The very first hypothesis in this study which stated that self-reflective practices do not influence teacher's level of self-efficacy due to the treatment, was strongly and practically rejected, like the authenticity of this acclaim which has already been manifested in theory by other researchers. Applied treatment here aimed at exposing student teachers to as much mental challenges as possible via providing them with journal writing. This treatment statistically tested whether student teachers became better at self-reflection if they engaged continuously in reflective journal writing. In question student teachers were generally positive about the value of this technique in their learning and teaching.

The first hypothesis suggested that self-efficacy components, i.e. Classroom Management, Instructional Strategies, and Student Engagement, were not under the influence of teacher's experience of reflection practices. A statistically analyzed difference of 5.1% between two experimental and control groups rejects this claim. Reflection directly or indirectly enhanced the sense of teaching and being a teacher in the participants.

The second hypothesis was also strongly rejected by a difference of 5 Likert-scale between the experimental and control groups in their posttest and adequately delineated that experiencing a four-month course of reflection triggers a long-term willingness to think back on teaching henceforth. This hypothesis also showed that even if there was a four-month gap between posttest 1 and posttest 2, there was still reflection practices among student teachers and this was accompanied with a 1.92 point growth. This is considerably important to notice that this development in reflection has happened in the absence of any particular observation or treatment on behalf of the researcher.

Although none of student teachers in this study was considered professional, empirical long-lasting effect of reflection was potentially seen as a major source of inspiration for prosperous prospective professional teachers. In line with this study, further research may definitely convince mentors and teacher trainers to include professional teachers in such programs.

Taken together, the findings suggest that self-reflection on both how and what students have learned does lead to improvements in self-efficacy and in turn academic performance in the student teachers, although to a limited extent that they acclaimed. It was mainly because of the enhancement in organizing their teaching and learning components listed in The Reflective Teaching Scale (2010).

Due to inexperience and lack of finances in the realm of student teacher teaching programs, as well as within academia, the majority of student teachers cannot see an adequately prosperous end to their studies and this gets even more deteriorated with their negative self-concept, low self-esteem and self-worth in facing classroom problems and their



inability in solving them. Students' criticism could be one other injurious reaction to the body of student teachers' sense of efficacy. In one of its facets, this study tried to shed lights on this belief that teacher's reflection and critical thinking on whatever difficult situations s/he may encounter in the classroom, and other's experiences can enormously affect students' perceptions indirectly.

There was no abnormality among both the experimental and control participants regarding their abilities or physical conditions. Thus, none of the participants was omitted from the course. Student teachers' perception of reflective activities in response to Reflective Teaching Scale over the four-month period and in receiving the researcher feedback was overwhelmingly positive which indicates that the overall experience was positive. Moreover, this jovial state is reinforced more by students' approval of the teachers and observed changes in the class.

Approximately ninety-seven percent of participants in the experimental group showed an increase of about 10% in their sense of self-efficacy, while ninety percent of the control student teachers had an increase of about 5% that was to a great extent due to observing the experimental group's activities and gatherings for group discussions in the language department.

Ninety-seven percent of experimental student teachers who enhanced self-reflective practices up to 11 points in Likert-scale in their teaching framework, compared to 4 points at the control group, claimed that journaling helped their teaching efficacy including instructional efficacy, their capability in class management, and finally motivating their students to engage more in class activities.

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Change of Perceptions of Disabilities among Middle School Students in Education about the Understanding of Disability through Korean Language Class

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Abstract

The purpose of this study is to concentrate on change of perceptions among students through applying researcher's profession; Korean Language, in learning curriculum of Inclusive Education.

Action research as a research method was conducted for this study and 29 middle school students (including 1 student with intellectual disability) participated in the research. The study was consulted with four practicum observers who were two well-experienced Special Education instructors and two instructors in Korean Language Education. In addition to conducting a survey before and after the practicum exercising Siller's DFS (Disability Factor Scales), it was analyzed using Pared Sample T-Test with SPSS Statistics ver. 24.0 program.

The outcome of this study via Inductive Method present; two parent categories, eight sub categories, and 31 meaning units, as the change of perceptions of disabilities among middle school students. The statistical mean of before-after perceptions using the Paired Sample T-Test of also supports the benefit of implementing Understanding of Disability into learning curriculum.

Keywords: change of perceptions of disability, Korean Language Class, action research **Main Conference Topic:** Special Education

Introduction

The school is a place where students learn how to live with other people in the society. In particular, it can be easy for students with special needs to be isolated from this learning setting. Despite that kind of difficulty, we have tried to provide inclusive education to the students. It is because we all know how important it is for them to share educational experiences with students without disabilities (Kim, H., 2012).

Social cohesion is possible when the understanding of each other is positively formed. Such positive awareness and acceptance attitude toward disability are the basis for promoting quality interactions and making integrated education successful (Seo, H., & Kwon, H., 2009).

In order to achieve integrated education, students with disabilities must be included socially and functionally in society. In addition, students without disabilities are encouraged to learn about disability and have understanding about their friends with special needs.

Until now, education on understanding of disability has been carried out for a certain period of time such as "Disability Day". Students can watch videos to know information about type of disability and manners for people with disabilities (Seo, Y., 2016). These



methods have disadvantage of having to set the time separately and the problem that it can be an event.

In order to solve these problems, many studies have been conducted with various tools, for example, essay writing (Kim, H., 2011), writing activities (Kim, H., 2010), use of literature related to disability (Park, J., 2003), and films(Park, E., 2006).

It has been proved that these studies have positive effects on the change of recognition of disability of students. However, most studies were conducted on elementary school students.

Therefore, the researcher used the Korean language curriculum to focus on attitude changes of students without disabilities toward students with special needs

This study was conducted to investigate the effects of disability understanding education. The purpose of this study is to investigate how the dietary habits of middle school students change.

The research question is as follows.

First, what is the process of implementing disability education using Korean language lessons?

Second, how has it changed, through the disability understanding education using Korean language lesson?

Methods

In this study, the performance study method as a qualitative research method was applied and 4 sessions were designed. 28 non-disabled students and 1 disabled student in the same class participated in this study. We asked four observers to observe the sessions. It made me observe and reflect on them.

Implementation (alter the title to meet your paper requirements)

The type of disability for each session was selected, and then we gave a brief description of the type of disability that we organized a class.

In the disability understanding education using the middle school Korean language lesson class, observation data, interview data, participating students interviews, documentation, and questionnaires were collected in order to investigate the change of students' perception of disability. As shown in Figure 1, it is possible to connect with the understanding of disability education among contents of learning activities of textbooks. And selected modified activities were applied to the lesson.



Figure 1: The first activity of Students

We extended the learning contents of the roman notation to the sign language expression in the 2^{nd} session. Through these activities, I was able to identify and express the


sign language of sign language so as to express the degree of my own name to the hearing impaired person.

In the 3rd session, we learned about the principle of writing general report through the 'Report, Write it like this' lesson, and then conducted an activity report. Based on the advice of the teachers, the contents were structured so as to help the change of the recognition of disability through the activities that students directly experience.

The fourth session was a lecture titled "Lectures and Suggestions". It was to learn about listening to the lectures and reconstructing learning activities. The students watched videos about various types of disabilities in groups and summarized the contents to give questions to each other.

Results (alter the title to meet your paper requirements)

All the data obtained from this study were collected and analyzed in an inductive manner. The results of the analysis showed that there were two upper categories, 'you and we', 'diverse, non - discrimination', and 8 sub - categories. The results of the inductive analysis of the collected data are shown in Table 1.

 Upper category
 Subcategory

 You and
 It's hard to be together.

 You and
 We do not like your behaviours.

 Us
 An inconvenient truth

 Diversity, not difference,
 Dream and Challenge

 helping hands in right moments
 New Enlightenment Unknown before

 Change, What happened to me
 Consideration and respect, approaching with heart

 Table 1: Changes in Students' Disability Perception in Disability Understanding Education

 Using Korean Language Classes

In this study, a questionnaire was conducted to investigate changes in students' perception of disability. The questionnaire was administered two times using the Disability Factor Analysis Scale (DFS).

Variable	М	SD	t	р
Before sessions	2.4899	0.1167	-24.895	0.000
After sessions	3.2925	0.09737		
		·		

Table 2: Disability Attitude Factor Analysis Scale (DFS)

* P <.05

Conclusion

The researchers provided students with the opportunity to interpret literary works from various perspectives in the course of the 4th class and raised the interest of the class. In addition, it was time to listen to various opinions of students through group activities, and active participation of students in class encouraged concept formation and helped to understand contents. The class council raised the quality of the class through reflection and evaluation of the practice, and various experiences to improve students' disability awareness as well as achievement goal of curriculum education.

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Investigation of High School Students' Attitudes Towards STEM in Terms of Various Variables in the Context of School Type

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Abstract

This study is conducted to investigate high school students' attitudes towards STEM in the context of school type in terms of various variables, such as; grade, attendance to science centers, carrying out experiments in lessons, carrying out experiments as an extracurricular activity, using laboratories in lessons, preparing projects, participation in project competitions and getting information from an expert about STEM topics. Study is a descriptive one in the survey model. 712 high school students from 12 high schools in Gaziantep province in 2016-2017 academic year make up the sample of the study. "STEM Attitude Scale" used as the data collection tool of the study.

It has been determined in the study that 9^{th} grade students' attitudes towards STEM differ and this difference is in favor of Anatolian and Science High Schools between the ones choosing Anatolian – Science High School and Industrial and Religious Vocational High Schools. Another finding of the study is that there is significant difference in support of the 9^{th} graders' attitude points towards between the 9^{th} and 12^{th} graders studying at Anatolian High Schools; however, there is no difference among the students' attitude points towards STEM at other school types according to the grades they study in.

Keywords: STEM, STEM attitude, High School, School type **Main Conference Topic:** Cross-disciplinary areas of Education

Introduction

At a time when technology is changing swiftly and in the Industry 4.0 age, institutions acting in the field of education regard mathematics, science, technology and engineering each as a separate discipline. Not taking them as a whole brings about a number of problems. According to Senge (1990), problems we encounter or we may encounter in real life are tried to be taught to students partially rather than as a whole starting from the early ages. This case seeming pretty and through which we think that we can tackle complicated problems easily leads to our loss of inner motivation to consider the case as a whole in the next years according to Wicklein & Schell (1995). The integration concept has been spoken out by a large number of scientists and researchers to get a different point of view for the real life problems and approach situations as a whole. Lederman and Niess (1997) expressed that the integration concept means a whole not divided into parts and tried to explain this concept making use of the chemical compounds phenomenon. In that description, he stated that compounds are made up of elements having different qualities and only when these elements



are regarded as a whole does it have qualities peculiar to itself and thus compared integration to compound. In the light of this information, based on teaching science, technology, engineering and mathematics disciplines in an integrated manner and formed as an abbreviation from the initial letters of these fields, STEM (science, technology, engineering and mathematics) approach was created. Because STEM Training makes connection among these fields uncertain, it is stated that the integration concept is more appropriate (Wang, 2012).

STEM Training was used by Judith A. Ramaley, the founder of the National Science Foundation in the United States of America, as an educational term in 2001. In general terms, STEM is an approach offering real solutions for the knowledge-based real life problems under certain restrictions (Bybee, 2010; Corlu, 2012; Sahin, Ayar and Adiguzel, 2014; Voutour, 2015). This appproach calls for the usage of higher level of thinking such as entrepreneurship, calculated thinking and critical thinking. At the same time, it supports making use of mathematical calculation, engineering designing and approaches for the problems to be solved as well (Berlin and Lee, 2005; Reiss and Holmen, 2007; Riechert and Post, 2010; Honey, 2014; Yildirim and Altun, 2015).

As could be understood from these definitions, STEM aims at raising individuals who find out a variety of solutions using knowledge-based problems from real life, engineering designing and approaches, mathematical ways of solutions and technology (Corlu, Capraro and Capraro, 2014). Thus, it aims at improving higher level of thinking skills such as critical thinking, calculated thinking and analytical thinnking, too (Berlin and Lee, 2005; Reiss and Holmen, 2007; Moore, Stohlmann, Wang, Tank and Roehrig, 2013; Sahin, Ayar and Adıguzel, 2014, Riechert and Post, 2010; Honey, 2014; Yamak, Bulut ve Dundar, 2014; Yildirim ve Altun, 2015).

Additionally, in Oner and Copraro's (2014) study, they drew a conclusion that building cooperation between science centers and universities is a good method to enhance students' STEM performance. Then, in the study carried out by Sahin, Ayar and Adiguzel (2014), extracurricular activities as to STEM have a potential to contribute to independent and cooperative scientific researches and to the development of 21st century skills. Furthermore, there are some other researches stating that STEM-oriented activities have a positive impact on students' learning (Jerald, 2009; Levy and Murnane, 2004; Wagner, 2008). Moreover, there are various studies mentioning that STEM practices boost students' academic success (Hill, 2002; Green, 2012; Ozdoğru, 2013; Seong-Hwan, 2013 and McClain, 2015). When the studies conducted in the field of STEM in Turkey are gone through, it is striking that these studies focus on mostly STEM attitude, scale adaptation/development and the middle school level (Gulhan and Sahin, 2016; Karakaya and Avgın; 2016; Yildirim and Selvi, 2015; Koyunlu Unlu, Dokme and Koyunlu, 2016).

In this study, it was aimed at analyzing attitude towards STEM at the high school level within the context of school type studied. In line with this aim, the sub-goals of the study are presented below:

- **1.** Do 9th graders' attitudes towards STEM differ according to the school type they choose?
- **2.** Do the attitudes of high school students from different school types, Science High Schools, Anatolian High Schools, Industrial Vocational High Schools and Religious Vocational High Schools, differ according their grades?
- **3.** Do the attitudes of high school students towards STEM differ according to their attendance to science centers, carrying out experiments in lessons, carrying out experiments as an extracurricular activity, using laboratories in lessons, preparing projects, participation in project competitions and getting information from and expert about STEM topics differ?



Methodology

Research is conducted to investigate high school students' attitudes towards STEM in the context of school type in terms of various variables, this study is a descriptive one in the survey model.

The universe of the study is comprised of 9th and 12th grade students in the Anatolian High Schools, Science High Schools, Industrial Vocational High Schools and Religious Vocational High Schools in the central districts of the Gaziantep province in the Fall term of 2016-2017 academic year and 712 high school students from 12 high schools make up the sample of the study. Of these students, 291 are female and 421 are male. 30,4% of the students (215 people) studied in the Science High Schools, 21,6% (153 people) in the Religious Vocational High Schools, 33% (235 people) in the Anatolian High Schools and 15% (109 people) in the Industrial Vocational High Schools. When the students were assessed based on the grade they study in, 54,3% of them (384 people) were in the 9th grade and 45,7% of them (328 people) studied in the 12th grade.

The data concerning the research were gathered using "STEM Attitude Scale", developed by Faber, Wiebe, Corn, Townsend and Collins (2013), and the Turkish validity and reliability studies were conducted by Selvi and Yildirim (2015). The scale is a 5-likert type scale consisting of four sub-scales, that is, "mathematics", "science", "engineering-technology" and "21st century skills" and 37 items. In the scope of reliability studies, Cronbach's alpha calculated on the sample are .86, .91, .89 ve .91 for the sub-scales, respectively. The total reliability point of the scale was calculated .92. In the analysis of the data, independent samples t-test, one-way ANOVA and LSD post hoc tests and .05 is regarded as the significance level in the interpretation of the results.

Findings and discussion

High School Students' attitudes towards STEM were investigated in accordance with several variables in the research. The findings gathered from the study are presented below respectively.

9th graders' attitudes towards STEM according to the school type they choose

Test results of the 9th graders' attitude points regarding STEM according to the school type they choose are presented in Table 1.

High Schools	Ν	\overline{X}	S	F	р	LSD			
Anatolian High School (A)	126	139.76	20.23			A > I			
Science High School (S)	125	138.49	17.98						
Industrial Voc. High School (I)	55	131.23	19.50	8.584	.000	S>I			
Religious Voc. High School (R)	78	126.32	24.74			S>R			
Sum	384	135.39	21.25			57 IX			

Table 1. Means, Standard Deviation Values and One-Way Variance Analysis of the 9thGraders' Points Regarding STEM According to the School Type They Choose

When Table 1 is studied, it is seen that 9th graders' STEM attitude mean is 139,76 for those choosing Anatolian High School; 138,49 for those choosing Science High School, 131.23 for those choosing Industrial Vocational High School, 126,32 for those choosing Religious Vocational High School and that there is a significant difference at the level of .000 among the means of the groups [F(3,380)= 8.584, p<.01]. According to the LSD test results, there is a significant difference in support of those preferring Anatolian and Science High



Schools between those preferring Anatolian and Science High Schools and Industrial Vocational High School and Religious Vocational High School.

In the literature, though there seems to be no study investigating whether 9th graders' attitudes towards STEM differ, there are some complying with the findings of the current study. Celik and Ceylan (2011) established that mathematics attitudes of science high school students are significantly different from those in other types of high schools and Mumcu, Mumcu and Aktas (2012) found out that Industrial Vocational High School Students do not like mathematics depending on the fact that they cannot comprehend, regard it as boring and feel anxiety and fear against the lesson. Then, Mutlu (2006) noticed a difference in favor of Anatolian High School students between Anatolian High School and Science High School students in their attitude points concerning Biology, whereas Ozbas (2016) found out that there is no significant difference in students' attitude points towards Biology on the basis of the school type. Anatolian and Science High Schools are the ones in which science and mathematics are predominantly implemented (Turgut, 2014). A more extensive science and mathematics curricula at these schools are in use than at other schools for the students choosing these schools based on the points they get after a nation-wide exam after the middle school. In this context, as stated in the research findings, it is significant that the students with higher STEM attitudes choose these types of schools.

Attitudes of students at different types of schools towards STEM according to grades they study in

Test results conducted to see whether attitudes of students at various high schools towards STEM differ according to the grades they study in are presented in Table 2.

High Schools	Sınıf	N	\overline{X}	S	df	t	р
Anatolian High School	9	126	139.76	20.83	233	4.180	.000
	12	109	127.93	22.53			
Science High School	9	125	138.49	17.98	213	.314	.754
	12	90	137.65	21.20			
Industrial Voc. High School	9	55	131.23	19.50	107	107	.056
	12	54	122.80	25.61			
Religious Voc. High School	9	78	126.32	24.74	151	293	.770
	12	75	127.47	23.83			

Table 2. Independent Samples T-Test results of students according to the grade they study in

When Table 2 is analyzed, there is a significant difference in support of the 9th graders betweeen the attitude points of the 9th and 12t^h grade students at Anatiolian High Schools towards STEM (p<.01). In the study carried out by Ekici and Hevedanlı (2010), a significant difference in support of the 9th graders between the students' attitude points towards Biology, which is a field related to STEM based on the grades they study in. A similar result was expressed in a research implemented by Cevik and Ekici (2008).

As presented in Table 2, another finding obtained from the study is that there is no statistically significant difference among the attitude points of the studnts at Science High Schools, Industrial Vocational High Schools and Religious Vocational High Schools (p>.05). However, there is a decrease in 12th graders' attitude points towards STEM at Science High Schools, Anatolian High Schools and Industrial Vocational High Schools when compared to those in the 9th graders. In Ozbas's (2016) study, the sample of which is comprised of Science High Schools and Anatolian High Schools, he established that there is no significant difference among students' attitude points according to their grades they study in. Yet, also in this study, it is remarkable that the attitude point means of the last grade students are lower

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than those of the 9th graders. This case may stem from the fact that an exam-oriented subject review and test studies are performed rather than sparing enough time to the activities, experiments and projects related to STEM as they are predominantly anxious of success at the university entrance examination (Cepni, Kaya and Kucuk, 2005; Ozden, 2007).

Differentiation of High School students towards STEM in terms of various variables

Whether the attitudes of high school students towards STEM differ according to various variables presented below were analyzed and results are provided in Table 3.

•	-		•			
Variables	N	\overline{X}	S	df	t	р
Attendance to science centers(Yes)	216	136.42	21.08	707	2.941	.003
Attendance to science centers(No)	493	131.06	22.88			
Experiments in lessons(Yes)	161	135.98	22.93	707	2.090	.037
Experiments in lessons (No)	548	131.77	22.34			
Extracurricular experiments(Yes)	321	138.31	21.61	707	6 201	000
Extracurricular experiments(No)	388	127.95	22.09	/0/	0.201	.000
Study in laboratory (Yes)	149	135.46	22.10	700	1 667	007
Study in laboratory (No)	562	132.02	22.57	709	1.002	.097
Preparing Projects (Yes)	330	135.43	22.91	707	2 0 4 2	002
Preparing Projects (No)	379	130.31	21.90	/0/	5.045	.002
Project competitions (Yes)	132	140.52	23.69	710	1 100	000
Project competitions (No)	580	130.98	21.84	/10	4.460	.000
Meet with STEM expert (Yes)	221	136.68	22.52	709	019	001
Meet with STEM expert (No)	489	130.86	22.23	708	.918	100.

 Table 3. Independent Samples T-Test results of the students

When Table 3 is gone through, the attitudes of high school students towards STEM differ significantly in terms of attendance to science centers, carrying out experiments in lessons, carrying out experiments as an extracurricular activity, interest in preparing projects, participation in project competitions and getting information from and expert about STEM topics(p<.05), there is statistically significant diffence according to whether they use laboratories in lessons (p>.05). Likewise, Finson and Enochs (1987) also determined a significant diffence in the attitude points of the students in favor of those visiting science museums when compared to those who do not. Sulun, Ekiz and Sulun (2009) stated that attitude points of the students taking part in project competitions towards science and tecnology course are higher and also the more frequently experiments are conducted in science laboratories, the more positively the students' attitudes toward science and technology are affected. Similar to these, project work affect students' attitudes towards the science course positively in a number of researches (Sezgin, Caliskan, Callica and Erol, 2002; Morgil, Yilmaz and Gungor, 2002). All these studies support the findings derived in the current study in a way.

Results and suggestions

It has been determined that 9th grade students' attitudes towards STEM differ and this difference is in favor of Anatolian and Science High Schools between the ones choosing Anatolian – Science High School and Industrial and Religious Vocational High Schools.

Another finding of the study is that there is a significant difference in support of the 9th graders' attitude points towards between the 9th and 12th graders studying at Anatolian High Schools; however, there is no difference among the students' attitude points towards STEM at other school types according to the grades they study in.



Furthermore, it has also been established that students who attend science centers, carry out experiments in lessons, feel interest in projects, participate in project competitions and get information from and expert about STEM topics develop a more positive attitude towards STEM when compared to those who do not. In this research, the attitudes of the students towards STEM were analyzed in terms of several variables. The reason why the students' STEM attitude points decrease as the grade goes up could be studied in longitudinal researches and students could be intervied to study their attitude towards STEM intensively.

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Examining social media usage aims of teacher candidates

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Abstract

Recently, social media usage is getting more and more common among people around the world and social media are generally used by higher education students. Hence, this quantitative study aims to examine social media usage of teacher candidates based on several variables. The sample of this research constitutes 206 teacher candidates who are studying at Mehmet Akif Ersoy University, Faculty of Education. The data was collected via scale and inferential statistics were applied. This study shows that teacher candidates prefer to share their names, photographs and university information in social media, but they seem to be avoiding sharing more sensitive issues such as political views. Also, they use social media for generally communication and research. In addition, female teacher candidates prefer to use social media more for research, communication and sharing according to male teacher candidates. Lastly, those who have high social media use experience and those who use social media more frequently on a daily basis, use social media more for research, communication, entertainment and sharing purposes.

Keywords: Social media, teacher candidate, Facebook

Main Conference Topic: Social Networking

Introduction

Recently, social media usage is getting more and more common among people around the world. Higher education students prefer social media networks for several purposes such as communication, sharing information, having fun, academic activities. Social media networks are especially preferred by higher education students (Falahah and Rosmala, 2012). When the literature review is carried out, it can be seen that there are a variety of studies within in the scope of social media network usage purposes of university students. In their research with 86 teacher candidates, Bicen and Çavus (2011) investigated the Facebook usage of participants. Data of the study was obtained by using online survey which had two sections; demographic information and time spent in Facebook. The results of the indicate that most of the participants (%32) use Facebook more than 4 hours per a day while a percentage of % 24 use Facebook daily 1 hour. In addition, according to results, the habits of the teacher candidates chatting and messaging to people in their environments, sharing links, news and photos, playing games and being aware of events. In another study, Falahah and



Rosmala (2012) conducted a research for investigating the social media networking usage in higher education environment. Data was obtained by using a survey with 300 participants. According to results, most of the participants use social media networks within the purpose of sharing their feelings, opinions and anything to their social media friends. Data also shows that communication and academic activities are other purposes of using social media networks among higher education students. Within the scope of academic activities, participants indicate that they share educational resources, task assignments and information. Additional to these, results show that some of the participants prefer social media networks for communication with their friends and having fun. Investigating university students' purposes of using social media networks is one of the aims of a study which is conducted by Öztürk and Akgün (2012). The study is managed by using a survey with 659 university students. Results of data analysis demonstrate that participants mostly use social media networks daily between 1 and 3 hours and main purposes of using these networks are sharing videos, photos and messaging to each other. Another results show that students use social media to maintain their friendship instead of having new friends. In another study, Akyuz et. all (2012) conducted a qualitative study in order to investigate teacher candidate's social networking trends with 5 teacher candidates. After the contents analysis of the data, it had been seen that Facebook is the most preferred social network among participants. According the results of the study, within the purpose of social network usage the social networks were mainly preferred for communicating with others, having fun, education, sharing something and taking social responsibility. Besides, the results indicate that tagging people in a photo is one of the most preferred features of the social networks. Within the purpose of social network usage, results show that social network is a tool for enhancing the socialization.

In this context, this study aims to examine social media usage of teacher candidates based on several variables. To be more specific the research questions are;

- What are the purposes of teacher candidates' social media usage?
- Is there any difference between gender and social media usage?
- Is there any difference between social media experience in years and social media usage?
- Is there any difference between the daily use of social media and social media usage?

Methods

In this study, a descriptive survey model was used to determine the participants' social media usage aims. The sample of this research constitutes 206 teacher candidates who are studying at Mehmet Akif Ersoy University, Faculty of Education. Demographic information of participants is given in table 1.

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		Ν	%
Gender	Female	141	68,4
	Male	65	31,6
Department	Elementary School Education	91	44,2
	English Language Teaching	60	29,1
	Guidance & Psychological Counselling	38	18,4
	Science Education	17	8,3
Social Media	Less than 1 year	43	20,9
Experiences	1-3 years	123	59,7
	More than 3 years	40	19,4
Daily social media	Less than 1 hour	83	40,3
usage	1-3 hours	91	44,2
	More than 3 hours	32	15,5

Table1: Demographic information of participants

The "Social Network Usage Scale" developed by Usluel, Demir and Çınar (2014) was used as data collection tools in the research. This scale is consisted of 26 7-likert type questions and the answers to each item vary between "I absolutely agree" (7) and "I absolutely do not agree" (1). In addition, the scale consists of "Research", "Cooperation", "Initiating Communication", "Communication", "Continuing Communication", "Sharing", "Entertainment" factors. The high arithmetic mean scores of these factors can be interpreted as the fact that individuals use social networks extensively for this purpose. In this study, the reliability coefficients for each factor were calculated between 0.77 and 0.88. In addition to this, there is a section which includes participant's gender, department, social media experience (Facebook, Twitter and Instagram), daily social media usage frequency (Facebook, Twitter and Instagram), information type shared in social media and sending/accepting friendship request information. Descriptive data obtained from the data collection tool were analyzed by calculating average and frequency, in the inferential analyzes, t test and variance analysis (ANOVA) were performed by examining the normal distribution. According to the result of analysis of variance, post hoc tests were performed.

Findings

Initially, participants' social media usage purpose, shared information and sending/ accepting friendship situation request were examined. Participants' shared information in social media is shown in Figure 1.



Figure 1: Shared Information in social media



According to figure 1, it is seen that the participants share their most real names, photographs and university information in social media, at least address, political opinion and telephone information. Participants' sending/accepting friendship request situatuon is shown in Figure 2.



Figure 2: Sending/Accepting friendship request

According to figure 2, it is seen that the participants send friendship request from social media most of their friends, relatives and teachers; accept from most of their friends, relatives and teachers too. Results of participants' social media usage purposes are given in Table 2.

Tuble 2. Social media usage purposes							
	Ν	Min	Max	Mean	sd		
Research	206	1,00	7,00	4,8204	1,54870		
Cooperation	206	1,00	7,00	4,3956	1,42234		
Initiating	206	1.00	7.00	2 6362	1 51800		
Communication	200	1,00	7,00	2,0302	1,51800		
Communication	206	1,00	7,00	5,3859	1,79235		
Continuing	206	1.00	7.00	1 7251	1 62504		
Communication	200	1,00	7,00	4,7554	1,02394		
Sharing	206	1,00	7,00	3,7748	1,46015		
Entertainment	206	1,00	7,00	4,3786	1,59134		
Total	206	1,00	7,00	4,2720	1,16121		

m 11	•	a • 1	1.		
Table	2:	Social	media	usage	purposes
		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~			P P

When participants' social media usage purposes are examined; most of them used social media to communicate and research. Moreover, it is seen that the rates of using social media to initiate communication are low. Results of change in social media usage purposes by gender are given in Table 3.

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	1		· ·		Ĩ	
Factors	Gender	Ν	Mean	t	df	р
Research	Female	141	5,0213	2,787	204	,006
	Male	65	4,3846			
Cooperation	Female	141	4,4953	1,485	204	,139
	Male	65	4,1795			
Initiating Communication	Female	141	2,6998	-1,941	204	,054
	Male	65	3,1385			
Communication	Female	141	5,5674	2,159	204	,032
	Male	65	4,9923			
Continuing Communication	Female	141	4,8156	1,042	204	,298
	Male	65	4,5615			
Sharing	Female	141	3,9206	2,129	204	,034
	Male	65	3,4585			
Entertainment	Female	141	4,4610	1,094	204	,275
	Male	65	4,2000			

Table 3: Change in social media usage purposes by gender

According to the table 3, participants' use of social media for research purposes (t(204)=2,79; p<.05), for communication purposes (t(204)=2,16; p<.05) and for sharing purpose (t(204)=2,13; p<.05) differ significantly by gender. According to this; it is seen that female teacher candidates prefer to use social media more for research, communication and sharing according to male teacher candidates. Results of change in social media usage purposes by social media experiences are given in Table 4.

		SS	df	MS	F	р	Groups*
Research	Between Groups	29,71	2	14,859	6,529	,002	2>1 3>1
	Within Groups	461,97	203	2,276			
Cooperation	Between Groups	17,78	2	8,891	4,547	,012	3>1
	Within Groups	396,94	203	1,955			
Initiating	Between Groups	4,27	2	2,135	,926	,398	
Communication	Within Groups	468,11	203	2,306			
Communication	Between Groups	81,51	2	40,759	14,33	,000	2>1 3>1
	Within Groups	577,05	203	2,843			
Continuing	Between Groups	30,49	2	15,245	6,051	,003	2>1 3>1
Communication	Within Groups	511,46	203	2,520			
Sharing	Between Groups	36,00	2	18,002	9,112	,000	2>1 3>1
	Within Groups	401,06	203	1,976			
Entertainment	Between Groups	25,325	2	12,662	5,205	,006	2>1 3>1
	Within Groups	493,80	203	2,433			

Table 4: Change in social media usage purposes by social media experiences

*1: <1 year, 2: 1-3 years, 3: >3 years

According to the table, participants' use of social media for research, cooperation, communication, continuing communication, sharing and entertainment purposes differ significantly from their experiences of using social media. According to this; those who use



social media more than 3 years and 1 to 3 years, prefer to use social media for research, communication, continuing communication, sharing and entertainment more than those who use less than 1 year. In addition, those who use social media more than 3 years prefer to social media for cooperation more than those who use less than 1 year. Results of change in social media usage purposes by daily usage are given in Table 5.

		SS	df	MS	F	Р	Groups
Research	Between Groups	17,22	2	8,611	3,684	,027	2>1
	Within Groups	474,46	203	2,337			
Cooperation	Between Groups	23,15	2	11,58	6,003	,003	2>1 3>1
	Within Groups	391,56	203	1,929			
Initiating	Between Groups	13,81	2	6,906	3,057	,049	2>1
Communication	Within Groups	458,57	203	2,259			
Communication Between Groups		34,96	2	17,48	5,692	,004	2>1
	Within Groups	623,60	203	3,072			
Continuing	Between Groups	36,36	2	18,18	7,300	,001	2>1
Communication	Within Groups	505,59	203	2,491			
Sharing	Between Groups	60,31	2	30,15	16,25	,000	2>1 3>1
	Within Groups	376,75	203	1,856			
Entertainment	Between Groups	41,68	2	20,84	8,863	,000	2>1 3>1
	Within Groups	477,44	203	2,352			

Table 5: Change in social media usage purposes by daily usage

*1: <1 hour, 2: 1-3 hours, 3: >3 hours

According to the table, participants' use of social media for research, cooperation, initiating communication, communication, continuing communication, sharing and entertainment purposes differ significantly from their daily social media usage times. According to this; those who use social media more than 3 hours and 1 to 3 hours, prefer to use social media for collaboration, sharing and entertainment more than those who use less than 1 hour. In addition, those who use social media 1-3 hours prefer to social media for research, initiating communication, communication and continuing communication more than those who use less than 1 hour.

Discussion

In this study, it was aimed to examine the social media usage of the students of the teacher candidates according to various variables. First, when social media shares of students are examined, it is seen that they share their names, photographs and university information in social media, but they seem to be avoiding sharing more sensitive issues such as political views. It is also seen that participants are in contact with people they know in social media but they do not prefer to be friends in social media with people they do not know. It can be seen from this that students prefer to avoid being in contact with the people they do not know while using social media and to be more careful in their sharing. This result is also indicated in a study by Hew (2011). Hew (2011) stated that students use Facebook to communicate with people they know in general. This situation is in parallel with this study. However, Hew

(2011) stated that students are generally likely to share more personal information in Facebook, and that they are prone to expose security problems. In another study, Akyuz, Yetik, Bardakci, Alakurt, Numanoglu and Keser (2012) reached the conclusion that teacher candidates did not share information except their birthday and university information. In this study, it is seen that the students are very careful about this issue. On the other hand when the purposes of participants' social media usage is examined, they use social media for generally communication and research. This is similar to the study conducted by Cheung, Chiu, and Lee (2011) that students who use Facebook for interaction and communication with their friends are the biggest influencers of social existence. In another study, Bicen and Cavus (2011) stated that participants mostly use social media to communicate with friends and family through various applications (chat, message) and to increase communication by sharing photographs. In addition female teacher candidates prefer to use social media more for research, communication and sharing according to male teacher candidates. Another result in this research is that those who have high social media use experience and those who use social media more frequently on a daily basis, use social media more for research, communication, entertainment and sharing purposes. According to this, it can be said that those who are experienced in using social media use it for research purposes as well as for communication and entertainment, and as the social media experience increases, they are more conscious of using social media for different purposes. This study sheds light on teacher candidates using social media. So, it is recommended that this study be further developed to clarify the use of social media by teacher candidates in other universities in Turkey.

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Cooperative Learning in a Professional General University Geometry Course

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Abstract

This paper explors the outcomes of applying cooperative learning in an innovative university geometry course. The idea of course design is to blur the boundaries between general and professional courses. It aims to develop a course taking the history of the development of geometric concepts, basic theories in college geometry and their related applications as the core. Cooperative learning is facilitated by pairing major and non-major math students to discuss specified geometric topics from each other's professional perspectives. The result of this study shows positive impacts on the learning outcomes for both groups of students.

Keywords: Cooperative Learning, College Geometry, Professional General Courses **Main Conference Topic:** Higher Education, Science Education (University Mathematics Education)

Introduction

Mathematics is one of the essential requirements for modern citizens. In addition to its accuracy and extensiveness, mathematics also represents advanced cultures. Therefore, learning of mathematics should be at more than an instrumental level. Understanding the social and cultural contexts in mathematics can help to extend mathematical comprehension to the intellectual level. Among the various branches of mathematics, the developmental processes of geometry have their rich historical backgrounds with stories attached. Geometry is closely related to culture, art, architecture, and the development of science and technology, as well as the exploration of the universe. For example, students can learn geometry from architecture (Chen, 2013). Thus, the contents of geometry are suitable for general and liberal education curricula in university. These included understanding of the relationship between geometry and the development of *civilization*, and of rigorous *logic* in geometry, as well as the objective to experience the *beauty* of geometry (Chen, 2016).

This study conducted action research in an innovative university geometry course by using questionnaires to investigate the effect of the course design. Specifically, it examined the understanding of math major students regarding the overall concept of geometry and its development history, as well as the understanding of non-math major students regarding the basic mathematic theory of geometry and related history. The study also took account of the balance of professional and general education in order to generalize professional courses and investigated the learning outcomes of the interdisciplinary cooperative learning system. The research result indicated that cooperative learning is beneficial to the improvement of students' learning outcomes.



Related work

Following is a brief review of relevant literature on the concept of professional general course and the teaching method of cooperative learning.

Professional general courses

Higher education today is profession and efficiency oriented, resulting in the imbalance between professional and general education and the common phenomenon of valuing profession but ignoring general education. It caused general education to be put in an obscure position without specific course planning. Therefore, the course credit structure is fragmented, and the course planning is either overly professional or excessively superficial (Chen, 2010). The Chinese University of Hong Kong has offered courses with double course codes that can simultaneously be professional and general courses. Courses with double course codes can solve the problem of course positioning. They also provide more reasonable and suitable courses for students. However, a comprehensive partnership must be built between the double courses and professional courses (Jenkins, 2002), to prevent concerns that the courses differ or are positioned differently.

The incorporation of general education into professional courses is also called the generalization of professional courses, which is frequently used to create a balance between professional subjects and general courses. However, attention should be paid to its effect. It includes the competition between general education and professional knowledge for class time, students' level of acceptance and perception, difficulties regarding adequate design of topics, and the lack of time (Chen, 2010). Therefore, such incorporation typically cannot simultaneously consider the teaching goals and depth of both general and professional education because of time limitation. Despite the decrease in the amount of time allocated for general education, the gap between general and professional education still cannot be reduced (Yoshida, 2002). This incorporation teaching method may only be applicable to few courses of particular nature. Its application may be difficult unless the teaching goals of professional education are adjusted. Professional subjects are typically divided into basic and advanced courses; this method should also be applied to general courses (Chen, 2016).

Teaching strategies of cooperative learning

Cooperative learning is a systematic and structured teaching method. Students are divided into several groups by teachers. Through mutual help and the sharing of opinions, resources, and responsibilities, group members can improve their personal learning performance and achieve the collective learning goals (Johnson & Johnson, 1994; Slavin, 1995). The definition of cooperative learning is as following:

- (a) Cooperative learning is a systematic teaching method.
- (b) Cooperative learning uses learning groups that involve more than two people.
- (c) Group members have the same learning goals.
- (d) Group members can discuss with each other.

(e) Cooperative learning can increase student development in several aspects, such as cognition, social interaction, and affection, which can help in facilitating their learning.

The form of cooperative learning should vary according to the learning goals and the roles played by teachers and students in classroom. For example, for the cooperative learning in a mathematics class, the cooperation tasks can be related to skill practice, exploratory learning, information collection, concept discussion, problem solving, peer teaching, remedial teaching, material review, and group tests (Davidson & Kroll, 1991). To be a real cooperative learning group, the adopted method of cooperative learning should comprise the



aforementioned five elements to formulate a cooperative learning environment that can encourage team members to interact and cooperate through the process of learning and reflection. Thus, the group's common goals can be achieved, and students' interpersonal relationship, cooperative and social skills, and learning performance can be enhanced. To help students to engage in cooperative learning, Johnson, Johnson, and Holubec (1998) proposed several teachers' tasks should engage in:

- (a) Clearly specifying the goals of the course,
- (b) Assigning students into learning groups before class,
- (c) Explaining learning tasks to students,
- (d) Supervising the outcome of cooperative learning and providing necessary assistance or strengthening students' teamwork skills at appropriate time, and
- (e) Assessing students' performance and helping students to hold team discussions.

Among the methods of cooperative learning, this study adopted the interdisciplinary cooperative learning, which integrated the methods of learning together and group investigation. Learning together was developed by Johnson and Johnson (1994) and is the easiest cooperative learning approach that has been applied widely.

Implementation

A three-credit double course "The History of Mathematics: Contribution of Geometry in Civilization" simultaneously covered a review of mathematics history, explanations of geometric concepts, and the introduction of geometry application, to examine the influence of geometry development on human life in various time periods. For students in the department of applied mathematics, taking this course can help them to integrate the professional knowledge they had acquired in specialized mathematics subjects from a macro perspective. For students of other majors, they can comprehend the history and influence of mathematics. These are the crucial objectives of this course. Through group discussion, learning, and presentation, this course also aimed to develop students' communication and scientific narrative abilities.

<u>Model</u>



The model of this study is shown as in Figure 1.

Figure 1. A flowchart of the course development procession

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Participants:

The research participants comprised the junior and senior university students in the department of applied mathematics and students who do not major in mathematics. In the 2014–2015 academic year, the number of students taking the course was 50, involving 31 applied mathematics students and 19 students from other departments (including history, physics, chemistry, computer science and information engineering, international business, information management, animal science and biotechnology, landscape architecture, law, and fine arts). The students were divided into eight teams by the course teacher. In each team, and ratio of applied mathematics students to students of other majors was approximately 3:2.

Action plans in the course

Here are the grouping method for cooperative learning and the selected topics for display of posters in the end of the course.

- (1) *Grouping method*: The two categories of students (those with mathematics major and those with other majors) separately chose their group members within their own category. Subsequently, the teacher matched two groups from the two categories of students to form learning groups according to the result of the pre-lesson questionnaire.
- (2) *Topics selection*: The topics selected in this course includes contents in the book "Germs of Geometry" (Barnes, 2012) such as Shapes and Solids, The Fourth Dimension, Topology, Bubbles, Harmony of Spheres, Projective Geometry, Chaos and Fractals, and Relativity. Every group was asked to make a poster in one of the topics.

Data collection and analysis Procedure

The students in this course were from various departments; student from the applied mathematics department and those of other departments were mixed and divided into groups. Group members read materials, wrote reports, and held poster exhibition through peer help and cooperative learning. During the process, this study designed pre-lesson, feedback, and evaluation by using questionnaires.

- (1) *Pre-lesson questionnaire*: The questionnaire was used to understand students' past experience in learning mathematics and the mathematics and geometry lessons that have left the strongest impressions. Some questions were designed to test students' mathematics knowledge and geometric concepts, and the students were also asked to write down their expectation of the course. The result can be compared with their feedback questionnaire.
- (2) *Feedback questionnaire*: Students reviewed the process they have undergone in this semester for preparing and fulfilling the tasks assigned during the course. This questionnaire sought to understand students' opinion about the interdepartmental grouping and their suggestions for the course teaching method.
- (3) *Evaluation questionnaire*: This questionnaire is a general evaluation comprising four questions as follows: "How would I recommend or introduce this course?"; "What have I learned?"; "What is my opinion on the course instructor?" and "What are the changes I have shown in learning."



Results

The researcher investigated the effect of cooperative learning during the course. Some of the questionnaire results are presented in this section. Particularly, the pre-lesson and feedback questionnaires are not anonymously answered. Therefore, they can show students' changes before and after they took the course. The evaluation questionnaire is anonymous and students only need to indicate whether they majored in mathematics or not. The following are representative feedbacks of selected **non-math-major student "a"** and **math-major student "b"**.

A. Results of the pre-lesson questionnaire

Question 1: What are the most interesting things in the process of learning math?

- **Student a:** *Math is both the subject in which I am most likely to feel frustrated, but also most likely to feel the sense of achievements.*
- **Student b:** *I* completed a challenging math question, and understood the origin of a formula which I have been using since I was little.

Question 2: Please write down your expectation for this course.

- **Student a:** Since I started university, my experience of math has been limited to computation $(+, -, \times, \div)$. I hope I can be taught something related to math and retain math knowledge different from my own subject.
- **Student b:** Although majoring in Math, compared with non-math majors, I am good at calculation but have a limited understanding of math history, mathematicians and their contributions. I hope this course can change it, and then I can explain math concepts in an easily understood way.

B. Results of feedback questionnaire

Question 1: Please write the pros and cons of interdisciplinary cooperative learning.

- **Student a:** Different majors have different ways of thinking, can see different viewpoints and directions to discussion, everyone develops their own strengths, to acquire perfect results.
- **Student b:** Interdisciplinary cooperative learning allows us to expose to different ways of thinking from different majors, so I can feel that other majors have their own characteristics and learn to respect those differences. The only thing is, it takes more extra time to discuss online; however, I still think interdisciplinary cooperative learning is more interesting and allows more brainstorming.
- Question 2: Please write down your recommendations or opinions about this course.
- **Student a:** The cooperative learning based on interdepartmental grouping was very interesting and gave us more brainstorming opportunities. I think this course was taught in diverse ways, and the content was substantial. With videos and extracurricular supplement, the course had an abundance of content, and poster making is a novel experience for me. The teacher is very friendly and professional and knows how to stimulate students' interest (especially for students who do not major in mathematics like me). I hope this course can be continued.
- **Student b:** I think the teaching content and the situation of my team are both satisfactory. I can perceive that the teacher spent a lot of effort on this course. He made the content as interesting as possible and close to our life, and he used many movies and videos in the class. He helped math major students like us to further understand the abstract content. Thank you for giving us this interesting class.

C. Results of evaluation questionnaire

Question 1: What have I learned?

- **Student a:** Geometry is closely related to human life; college students should have basic geometry literacy. Non-math majors also enjoyed the course because it was not delivered by dry lectures. Interdisciplinary cooperative learning promotes not only clearer thinking, but also more respect for different professional areas.
- **Student b:** The main things I have learned are the history and the application of geometry. For example, our report is about the study of bubbles. This topic is more relevant to everyday life and also more interesting. This course helps me expand my knowledge of geometry; I also learn to look at things with different perspectives; additionally, it inspires my future."

Question 2: Please write down your recommendations or opinions about this course.

- **Student a:** This is a very special math class which consists of students in the Department of Mathematics and other departments. There are group reports and discussions with students with different ways of thinking. Moreover, we can examine our learning outcomes through quizzes. Also, this math class is not dry or tough as everyone imagined; instead, it makes learning easy through rich information from videos and slides.
- **Student b:** This course is designed to allow us to understand the history of mathematics and the life and backgrounds of mathematicians. The teacher not only used PowerPoint slides to present the lessons, but also used video clips. The atmosphere in class was harmonious, pleasant, and I learned a lot from it. We had two reports, one in the mid-term and the other at the end; in particular, we made a poster at the end of the term. These are experiences which I have never had.

Conclusion

Based on the results, this study concludes the following:

- 1. <u>Calculations and proofs in mathematics can be included in general and liberal courses</u>: Mathematics as a general education course does not need to exclude calculations and proofs. Developing professional, higher levels of general education courses with mathematical theories which can be accepted by university students, especially for those who have no pressure from entrance examinations, will make it easier for them to recognize the essence of mathematics.
- 2. <u>The plan of professional, general and liberal courses should conform to students'</u> <u>expectations</u>: students are interested in the origin of mathematical concepts and practical applications, and these happen to be difficult for traditional mathematics curriculum to provide. Pre-lesson questionnaire also revealed students' expectations for the course, including to review and recall what have been learned, to understand the history of the development of mathematical concepts and to explain mathematical concepts to the public.
- 3. <u>The interdisciplinary cooperative learning led to concrete results</u>: the benefits of the interdisciplinary cooperative learning include exchanges ideas and discussions on topics related to geometry, understanding of different thinking patterns and characteristics of students from different disciplines. Through brainstorming on a set theme, students can see different views and find the right direction through discussions so as to fulfill their understanding of and develop awareness of the whole picture of geometric concepts.
- 4. <u>*Display of the multiple faces of geometry:*</u> the relevance of geometry to other areas can be found in the topics of the students' presentation of final results.

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5. <u>Students' positive feedback on overall course</u>: students appreciated the curriculum design, teaching materials, the cooperative learning mode and the presentation of final results.

Here are the recommendations. The interdisciplinary cooperative learning mode can facilitate students to better understand their professional area, and understand as well as respect others in different majors. This mode can serve as reference for other courses under the conditions of appropriate grouping and topics. Moreover, mathematics should not only serve an instrumental purpose; the development of mathematics and that of human material and spiritual civilization are closely related. Geometry has rich connotations; it is linked with each branch of mathematics, art, architecture, natural sciences, universe discovery and so on. It is suggested that universities set up geometry related general education courses in order to enhance university students' mathematical literacy.

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Investigation of the Relationship between Social Adaptation and Skills of Five-Six-Year-Old Children and Their Early Academic and Language Skills

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Abstract

The aim of the study was to investigate the relationship between social adaptation and skills and early academic and language skills of children aged five to six according to teacher and parental views. The population of the study, using the relational screening model, consisted of children, parents, and teachers of children aged 5-6 years who were attending to kindergartens affiliated to the Directorate of the Turkish Ministry of National Education in Afyonkarahisar province during 2016-2017 academic year. For the study group, 260 children, parents and teachers selected by random sampling among volunteer, normally developing children among the population were included. "Social Adaptation and Skills Scale" and "Kaufman Survey of Early Academic and Language Skills" were used as data collection tools in the research. According to the data obtained from the study, demographic information about children and parents were given as frequency and percentage distributions, and correlation values between social adaptation and skills and early academic and language skills were calculated. As a result of the research, it was found that there was a negative relationship between social adaptation scores of children and early academic and language skills scores, positive between social maladaptation scores and early academic and language skills scores.

Keywords: early academic skills, early language skills, social adaptation, social maladaptation

Main Conference Topic: Early Childhood Education Practices, Pedagogy, Educational Psychology, Education practice trends and issues

Introduction

Human beings are a social entity and have a continuous interaction with their surroundings from birth. The family ensures that the child gets his first experience in social development by creating his/her first social environment. The social interaction that starts in the family shows improvement with other adults and friends (Kandır, 2007). In this process, the acquisition of social adaptation and skills is of crucial importance in the child's social-emotional development. Social adaptation is the ability to initiate and maintain positive social relationships with others, such as social skills, communication, problem solving, decision making, self-management, and peer relationships, while being defined as the acquired behavioral ability consistent with social expectations (Işık, 2007). Within the context of peer relations; there are also skills related to initiating, sustaining and terminating interaction, coping with unpleasant situations, conflict resolution and assertiveness (Jenson, Sloane and Young, 1988). Acquisition of social adaptation and skills in the family, school and other environments. The



learning of social skills needs time to become permanent (McClelland, & Morrison, 2003). The individual learns new behaviors or replaces existing behaviors by using imitation, observation and modeling methods in interaction with the social environment (Bandura, 1977). That is, the child shows the behaviors reinforced by the models he/she observes and does not exhibit the punished behaviors. The child, as well as the roles that the community itself expects from its own ability to think, act and feel in order to be able to live a beneficial life both in himself/herself and in the society in which he/she lives (Hyson, 1994; Selçuk, 1997). With the acquisition of social adaptation and skills, the child is beginning to adapt to laws and non-written social rules even if society does not enforce it.

Since development must be considered as a whole, children's social skills as well as their academic skills need to be supported, identified and followed. Early academic skills, one of the skills the child earned in the preschool period; is comprised of language, early literacy skills, and math skills (Uyanık, & Kandır, 2010). Early literacy skills include skills such as verbal language skills, alphabet knowledge, phonological awareness, word knowledge, recognizing words beginning with the same sound, recognizing words ending with the same sound, and pointing out the word said among the written words (Morrow, & Gambrell, 2004; Neuman, & Dickinson, 2002). Mathematical skills consist of skills such as big and small concepts together with recognition, naming, matching, comparison, grouping, sorting, numbers, addition, subtraction and division, modeling, geometry and spatial logic, measurement, forming graphics. (Charlesworth, & Lind, 2007). Clearly, the perceptual stimulating and responsive cultivation of children by both parents and teachers, the early experiences with letters and numbers and positive interactions with the classroom and adult parents were all found to be effective in the early acquisition of academic and language skills (Burchinal et al., 2002). However, it is important for pre-school teachers to create a classroom environment that will improve their academic and language skills and to use various teaching methods and techniques (Uyanık, & Kandır, 2010).

Related work

When the literature on social adaptation and skills is examined, social behaviors have been associated with various variables. These variables include attachment style, social competence (friendship skills and peer relationships), gender, parent-child relationships, learning and academic skills. Accordingly, it has been noted that children who are securely attached are more socially competent than children who are not securely attached (Guerrero, & Jones, 2003). When social skills were examined in terms of gender variable, it was determined that girls had more positive social behaviors while boys were more aggressive. In studies aiming to determine the effects of parental involvement on social skills, it was found that parents' different attitudes towards their child's gender influence the social skills of their children. In a survey conducted by Updegraff, McHale, Crouter and Knonoff (2001), it was found that mothers were more likely to interact with girls in peer-orientated activities compared to fathers. In addition, Kandır and Orçan (2011) found that children aged between five and six had a positive relationship between early learning skills scores and social adaptation and skills scores in a study investigating the relationship between early learning skills and social adaptation and skills. Arnold, Kupersmidt, Voegler-Lee and Marshall (2012) found that children with good social skills in preschool have strong academic skills. While emphasizing that social skills such as cooperation, taking responsibility, communicating with others, empathy, and being at peace with the environment play a key role in adaptation to life, learning, and the development and sustainability of academic skills, it is important to emphasize that there is a limited number of studies investigating the relationship between social adaptation and skills and early academic skills. From this point of view, it was aimed



to investigate the relationship between social adaptation and skills and early academic and language skills according to the views of teachers and parents of five - six-year-old children.

Model

The research is a relational screening model for the purpose of investigating the relationship between social adaptation and skills and early academic and language skills according to the views of teachers and parents of children aged five to six years. The relational screening model, which is a type of screening model, is used to examine the existence and degree of relationships between two or more variables, to obtain clues about cause and effect and to better understand the cases studied (Büyüköztürk et al., 2010).

Study group

The study population consisted of children, parents and teachers of these children aged between five and six years old who were attending kindergartens affiliated to the Directorate of the Turkish Ministry of National Education in Afyonkarahisar province during 2016-2017 academic year. For the study group, 260 children, parents and teachers selected by random sampling among volunteer, normally developing children among the population were included.

When the demographic characteristics of the children in the study group were examined, 51.5% were girls, 48.5% were boys; 30.0% were the first child, 33.5% were the middle or one of the middles and 36.5% were the last child; 6.2% were the only child, 36.5% had one sibling, 41.5% had two siblings and 15.8% had three or more siblings. 4.2% of the mothers of the children included in the study were illiterate, 10% were primary school graduates, 73.8% were middle school graduates and 11.9% were high school graduates. 5.4% of the fathers were primary school graduates, 55.8% were middle school graduates, 34.2% were high school graduates and 4.6% were university graduates; 95.0% of the mothers did not work and 5% were workers; 4.6% of the fathers were civil servants, 47.7% were workers and 47.7% were self-employed.

Data Collection Tools

The research was conducted with children, parents and teachers who volunteered to participate in the survey after obtaining the necessary permits from Afyonkarahisar Provincial Directorate of the Turkish Ministry of National Education. The "General Information Form" developed by the researchers in order to collect personal information about the children and their parents related to the research (gender, sibling number, duration of preschool education, parents' ages, education status, professions), "Kaufman Survey of Early Academic and Language Skills" in order to assess early academic and language skills and Social Adaptation and Skills Scale in order to assess children's social adaptation status were used as data collection tools.

General Information Form: In the form developed by the researchers; there were items as the gender of the child, the order of birth, the number of siblings, the age of the parents, the level of parental education, and the parental occupation. The form was filled in by the parents.

Social Adaptation and Skills Scale (SASS): The scale is developed in order to determine the levels of social adaptation and social skills of children by Ömeroğlu and Kandır (2005) and it consist of two sub-tests. These subtests are social adaptation (1-17 items) and social maladaptation (18-25 items). The social adaptation sub-test consists of 17 items assessing the children' positive skills of communication, making friends, empathizing,



understanding feelings of other people, solving problems, collaborating, explaining feelings and thoughts, helping, being tolerant, and following the rules. The social maladaptation subtest consists of 8 items assessing the children' negative skills of fighting, interrupting others, harming the environment, complaining, being angry, and being affected by friends who do not comply with the rules. People who know the child (parents or teachers) use and assess the child based on the social adaptation and skill scale. The social adaptation sub-test requires a three point Likert-type scale, which consists of: "all the time (3 points)," "sometimes (2 points)," and "never (1 point)". The social discordance sub-test scale includes; "all the time (1 point)", "sometimes (2 points)" and "never (3 points)". The highest and lowest possible scores that can be obtained from the sub-test of social adaptation are 51 and 17, respectively, and the highest and lowest possible scores that can be obtained from the sub-test of social maladaptation are 24 and 8, respectively. The total social skill score is obtained by adding the points obtained from Social Adaptation and Skills Scale. As a result of the validity and reliability study, the reliability coefficient for social adaptation sub-test and the reliability coefficient for social maladaptation sub-test were defined as α =.93 and α =.83, respectively (Işık, 2007). In this study, the scale was filled in separately for each child by the parent and the teachers.

Kaufman Survey of Early Academic and Language Skills - K-SEALS: The original form developed by Kaufman and Kaufman (1993) provides an assessment of early language, cognitive proficiency and academic skills of children between 36-83 months. K-SEALS consists of three sub-tests including Word Knowledge, Numbers, Letters & Words and Articulation Survey, and four scales under these three subtests together with Early Academic and Language Skills Composite. It is administered in a quiet and suggesting environment. When the test is being performed, the picture of each item in the test book is shown to the children, the instruction of the illustration is read aloud, and children are expected to respond. For each correct answer, one (1) score is recorded on the test record form and zero (0) points for each incorrect answer. The test consists of a total of 90 items and it takes 15-25 minutes for each child to administer. The raw score for each subtest is the number of items correctly answered (Kaufman, & Kaufman, 1993). According to the confirmatory factor analysis results of K-SEALS which was adapted to Turkish by Uyanık and Kandır (2014) in Turkey, it was determined that the one-dimensional factor structure was confirmed. The KR-20 reliability coefficient for K-EADBAT was found to be .971 and the item total correlation coefficient of the majority of the items was at a high level of reliability. The test retest correlation for K-SEALS total was set at .908. The relationship between the two test results was found to be significant at p < 0.01 level. The test was carried out by the researchers individually in a quiet environment with each child.

Analysis of Data

Frequency and percentage distributions were used in the analysis of the collected data through "General Information Form". Correlation values were calculated for the relation between "Social Adaptation and Skills Scale" and "Kaufman Survey of Early Academic and Language" subtest / factor and total scores.

Results

The results of the research conducted to examine the relationship between social adaptation and skills of five-six year old children and their early academic and language skills according to teacher and parental views were presented in Table 1 and Table 2 respectively.



Social Adaptation and Skills		Early Academic and Language Skills						
		Word Knowledge Numbers, Letters & Words		Articulation Survey	K-SEALS Total			
C1	r	.336	.378	.248	.433			
Social	р	.000*	.000*	.000*	.000*			
Adaptation	n	260	260	260	260			
Social	r	172	254	-,152	257			
Social Maladaptation	р	.005*	.000*	.014*	.000*			
манаарынон	n	260	260	260	260			

Table 1. Correlational Distributions of Social Adaptation and Skill Scores by Teachers' Views of Children and Early Academic and Language Ability Research Test Scores

*p<.05

According to Table 1, with reference to the opinions of the teachers, as children social adaptation sub-factor scores increased; significant increased in the word knowledge sub-test (p < .05), numbers, letters & words subtest (p < .05), articulation survey (p < .05), and K-SEALS total scores (p <.05) were found out. However, as children's social maladaptation sub-factor scores decreased; there was a significant increase in the scores of word knowledge sub-test (p < .05), numbers, letters & words subtest (p < .05), articulation survey (p < .05), and K-SEALS total scores (p < .05). According to this, there was a statistically significant linear relationship between Social Adaptation sub-factor score and K-Seals sub-tests and total scores in the positive direction, ranging from 248 to 433; and a statistically significant negative correlation between the Social Maladaptation sub-factor score and the K-SEALS subtests and total scores in the negative direction, ranging from -.152 to -.257.

Table 2. Correlation Distributions of Social Adaptation and Skills Scale scores according to Parental Opinions of Children and Kaufman Survey of Early Academic and Language Skills Scores

Social Adaptation and Skills		Early Academic and Language Skills						
		Word Knowledge Numbers, Letters & V		Articulation Survey	K-SEALS Total			
Secial	r	.200	.340	.130	.299			
Adaptation	р	.001*	.000*	.036*	.000*			
Adaptation	n	260	260	260	260			
C: -1	r	183	332	064	260			
Social Maladaptation	р	.003*	.000*	.302	.000*			
manaapianon	n	260	260	260	260			

*p<.05

Table 2 presents that according to parental opinions, as children social adaptation subfactor scores increased; significant increases were found out in the word knowledge sub-test (p < .05), numbers, letters & words subtest (p < .05), articulation survey (p < .05), and K-SEALS total scores (p <.05). However, as children's social maladaptation sub-factor scores decreased; there was a significant increase in word knowledge subtest (p < .05), numbers, letters & words subtest (p < .05) and K-SEALS total scores (p < .05) while it was determined that there was not a significant increase in the articulation survey scores (p>.05). According to this, there was a statistically significant linear relationship between social adaptation subfactor score and K-SEALS sub-tests and total scores in the positive direction, ranging from 130 to 340 whereas an inverse relationship was found out between the social maladaptation sub-factor score and the K-SEALS subtests and total scores in the negative direction, ranging from -.064 to -.332.



Discussion

It was found that the early academic and language skills scores increased as the social adaptation and skill scores of the children increased according to the teachers' and parents' opinions in this study which was conducted to investigate the relationship between social adaptation and skills and early academic and language skills according to teacher and parental opinions of the children aged between 5 and 6 (Table 1-2). According to these results; it can be said that there is a linear relationship between the social adaptation skills of children aged five and six and the early academic and language skills in the positive direction and inverse relationship between social maladaptation skills and the early academic and language skills in the negative direction.

When it comes to the "development is a whole" principle, the pre-school period covers the most critical years in which children acquire social, academic and language skills. Vygotsky emphasizes the importance of children's interaction with their environment in cognitive and language development and explains that the child who communicates with the environment through social skills, gains cognitive and language skills within the zone of proximal development. Children interact with their parents, friends and teachers as in this process they learn cognitive and academic skills such as concepts, relational thinking, analysis, synthesis, evaluation and reasoning through the social skills such as communicating, making friends, cooperating, empathizing and being sensitive to the environment (Berk, 2013). At the same time, the social skills and prosocial behaviors that the child has have brought him to be successful in the academic direction because he/she overcomes the problems with teachers, parents and friends, and strengthens the communication between the people around him/her (Crosnoe et al., 2010). Dobbs, Doctoroff, Fisher and Arnold (2006) carried out a cross-sectional study of the relationship between social-emotional skills and math skills and reported that self-control and loyalty skills were associated with more successful math skills and that more comprehensive behavioral problems, internal symptoms, withdrawal, and social problems and attention problems were associated with weaker mathematical skills. It was also found that children who had early mathematics education had less behavior problems than those who did not, and participation in early mathematics education reduced the relations between social emotional difficulties and math skills. In addition, it was determined by Kandır and Orcan (2011) that the relationship between the early learning skills of children aged five and six was positively correlated with the children's social adaptation and skill scores. Arnold, Kupersmidt, Voegler-Lee and Marshall (2012) found that children with good social functioning in preschool have strong academic skills. Friedman-Weieneth, Harvey, Youngwirth and Goldstein (2007) found that pre-school children had aggressive behavior was associated with poor early literacy skills while Doctoroff, Greer and Arnold (2006) found that aggressive behaviors in boys and rare prosocial behaviors were associated with the same reason. On further education levels, children's academic incompetence can lead to frustration, reduced learning opportunities and more aggressive behaviors which can lead to a failure cycle (Miles, & Stipek, 2006).

Conclusions

The results of the research carried out so far and presented above are parallel to the findings derived from this study in that there is a linear relationship between the social adaptation skills of children aged five and six and the early academic and language skills in the positive direction and inverse relationship between social maladaptation skills and the early academic and language skills in the negative direction.

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Implications

The following suggestions can be presented to the authorities:

- Under the supervision of the Turkish Ministry of Education, teachers and parents can gain awareness about the integrated support of children in terms of social, cognitive and language development through channels such as media, distance education, inservice training and e-learning and thus provide better guidance and support to children in the early period.
- With reference to the holistic approach in development, early intervention programs for children's social, academic and language skills can be prepared and long-term effects can be examined.
- The early childhood education undergraduate program curriculum may include more effective practices in relation to fostering social, academic and language skills that support holistic development.

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Brief Biographies of the Authors

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The author graduated from the undergraduate program of Gazi University (Ankara-Turkey), Department of Child Development and Education in 2006 and fulfilled the criteria of the master's and doctoral degree at the same department while serving as a research assistant at Afyon Kocatepe University. Later, she was offered a teaching position in 2015 as an assistant professor at Afyon Kocatepe University, faculty of Education, Department of Early Childhood Education. She has many national and international articles and books especially on "early literacy and math skills development".

Ümit Ünsal KAYA

After getting the undergraduate degree from English Language Teaching program offered at Middle East Technical University (Ankara-Turkey), started his career as an English teacher at Afyon Kocatepe University, School of Foreign Languages. Whilst, he did his master's degree on Elementary Education Department and later, in 2012, he was offered a teaching position as a visiting lecturer at Department of Early Childhood Education. He is still pursuing his doctoral degree at Middle East Technical University and in his field of research, he is concentrated on "child development" and "teacher training".

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Having graduated from the undergraduate program of Gazi University (Ankara-Turkey), Department of Child Development and Education, she got her master's and doctoral degree at the same department and became an assistant professor in 2002 She is still working as a lecturer as a professor at Gazi University, Faculty of Vocational Education Department of Child Development and Education. The author has numerous national and international publications on "pre-school education programs" and "child development and education".



Transformation of Legal Education in the 21st Century - a Comparison of Third Year Law Students in Dealing with Blended Learning

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Abstract

This paper examines whether blended learning will be an ideal method of teaching students as compared to the traditional face-to-face teaching in relation to legal studies. It will also discuss how blended learning has developed so far in legal education since its inception in the 1990s. Traditionally, law students are being taught using the face-to-face method. However, with the advancement of technology, this paper argues that there is a need of law students to cultivate a good habit in utilising technology to assist them in their studies. Although there are several criticisms about using blended learning in optimising a student's ability to learn, there are also advantages in doing so. The author has conducted two experiments on level six law students of Coventry University London Campus (CULC) and University of Greenwich (UoG). The results have suggested that students are ready to accept blended learning when trying to gain the appropriate knowledge to enhance their learning experience. The result of using blended learning has contributed greatly towards obtaining superior results. Therefore, this paper will conclude that blended learning should be widely used in both teaching and learning.

Keywords: Blended learning, flipped classroom, legal studies, face-to-face teaching **Main Conference Topic:** Blended learning in legal education.s

Introduction

The phrase "blended learning" (Friesen, N., 2012) or "flipped classroom" appears to have been in existence since the late 1990s. The phrase "blended learning" itself is defined to be "a method of learning which uses a combination of different resources, especially a mixture of classroom sessions and online learning materials" (Yeung, K., & O'Malley, P.J.,2014). Irrespective of which name would it be called, these two synchronisms are nothing new in many educational systems today since the boom of technology in the late 1980s (Sonja, T., 2006). This is true because these words simply mean teaching students differently. From a personal point of view, these two names should be used interchangeably but it is never the same as flipped learning as suggested by the Flipped Learning Network (Network F.L., 2014).

Moreover, Luiza Caraivan (2011) argued that blended learning is not just a matter of revolutionized the way in which traditional lessons are being taught in class but more importantly, pupils should be able to understand what they have been taught. A good example will be where classes could have been conducted in a mixture of the traditional method as well as online-recorded lectures and seminars. In addition, students could also use their mobile devices to do simple offline exercises or live exercises via Socrative and Padlet as instructed by their lecturers or tutors (Khodabandelou, R., Jalil, H. A., Ali, W. Z., & Daud, S. M., 2015). This is important because students have diverse ways of absorbing the information being provided to them (Felder, R. M., & Brent, R., 2005). It is necessary for the academics to provide the necessary tools for them to learn to their best ability (Gulc, E., 2006). This is because there is no 'one-size fits all' (Frantzen, D., 2014) in this modern age' when it comes to learning.

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Blended Learning in Style

While the government is trying to encourage wider participation of blended learning in the educational sector, especially in relation to using blended learning in teaching English (Higgins, D., & Gomez, A. (n.d.), it is crucial to have a good understanding in relation to the types of blended learning that is available (Heick, T., 2016, May 26). Blended learning will require a student to be comfortable in using modern technological equipment. It could be achieved if students are motivated to use it (Heafner, T., 2004). Traditionally, materials are being distributed in hard copies for students. However, with the advancement of technology, e-mails and university portals are greater utilized. Materials are being uploaded onto Virtual Learning Environments (VLEs) and students will have the ability to download the required information. Students could also submit their coursework through TurnitIn via Moodle. Quizzes could also be set as part of the formative or summative assessment. The new generation of students seem to prefer flexibility when trying to access information via their gadgets (Beetham, H., 2013). Schools, colleges as well as universities in the United Kingdom have suddenly go digital. However, living in digital world would have to be treaded carefully as there are many obstacles as it will be discussed later in this paper.

Advantages in Using Blended Learning

Combining face-to-face with other teaching methods to teach can be absolutely rewarding. Uploaded materials to Moodle, for instance, save institutions a large substantial amount of money annually because there is no longer a requirement for them to print materials for students, e.g. digital transformation from using filing cabinet to using servers will be able to save money in the long run (John, M., 2008, January 08). With budget squeeze (Gravatt, J., 2014, May), going digital is the right way forward (Andalo, D., 2013, January 3) and it is more efficient (Turney, C., Robinson, D., Lee, M., & Soutar, A., 2009). Institutions could also embark on virtualization (Booth, S., n.d.) to prolong the life of existing computing hardware being used in the institutions. To enable an effective way of blended learning, there will be a requirement of good Internet connection in an institution.

On the other hand, academics need to be technologically savvy (Generation Tech: UK Youth Lead World's Digital Race, 2013, June 04). Academics could utilize the free apps e.g. Socrative to enhance student's learning experience by setting up tasks beforehand via Socrative before asking students to answer the necessary questions by using their mobile equipment. The benefit of using these facilities is that feedback to students will be instance, hence students will be able to learn from their mistakes and never to and hopefully they will not repeat their mistakes later. Students, on the other hand, will most appreciative when they are being given extra assistance. Moreover, students could also download and watch the online seminars as well as recorded lectures in addition to face-to-face lectures in the classroom. Feedback from the students is very positive (Please see the case studies below).

With the rise of innovative technologies, Massive Open Online Courses (MOOC) (Massive Open Online Courses: Higher Education's Digital Moment? 2013, May) are being rolled out by many universities worldwide with the intention to benefit the population in general. Generally, students can take up a course for free and they will be given a certificate of completion a course. The success of such completion of a course may contribute towards the completion of a degree offered by the university later. This is a good advertisement for the university as it may encourage more students to take up the course in the university to further their studies after completing the course online.


Challenges Ahead

While using technology to teach may allow an institution to save money in the long term, it is important to take note of the need of using proper modern technology in an institution. One major issue with using technology to teach is that existing technology may get outdated easily. Outdated computers could be infected by viruses and malwares. That is why it is always a clever idea to invest heavily in IT to ensure that the technology is safe to use for years to come. Problems such as server could not handle the necessary traffic, service is down or server is under attack (Robichaux, P., n.d.) could be eliminated. It is also important to have an effective IT support team and to provide sufficient training to members of staff as deemed necessary.

In addition, universities must be aware of cyber security (V., 2016). The recent events in relation to ransomware, especially with the news of a ransomware called "WannaCry" (Hern, A., & Gibbs, S., 2017, May 12), has put pressure on the UK government to ensure that their IT equipment is safe. It includes universities as well. To prevent any attacks on computer systems, the Operating System (OS) in computers should be updated when an update is released. It is also a requirement of all computers to have an antivirus programme with updated virus pattern file. Unpatched computers will be vulnerable to malware and virus attacks.

Students, on the other hand, would have to be technologically savvy. It is important for students to have the right information while accessing information on the Internet. Students must take necessary steps to prevent any mishaps by having constant backups and up to date antivirus software and its definition file installed on their laptops. Apart from that, it is also vital for students to update their laptop software periodically to ensure that their systems are protected from potential intrusion via the World Wide Web as well as installing suitable firewall software on their digital devices e.g. laptops. Institutions, on the other hand, could provide the necessary information for new students about the available facilities at the institution to ensure that they are well informed. Apart from that, students should be noted that it might be difficult for a student to stay focus while having access to modern social media apps in class when a class is in session.

Arguably, the biggest challenge for the time being is time management. It is submitted that uploading recorded lectures to VLEs will require more preparation and most probably it would have to be scripted as academics may be fearful of unnecessary words or sentences being used during the lecture and it has been recorded. It may lead to complaints if it has offended some students.

The Position of blended learning in Legal Education in the UK

Traditionally, studying for a law degree in the UK requires students to attend their classes face-to-face on a regular basis and they will have to print out their coursework when they need to submit their coursework. Law students are also required to sit for their final examinations in a secured environment. Materials will be provided via paper copy and technology is not widely used in dissemination of information.

With the influx of modern technology, lecture slides, seminar questions as well as quizzes are being disseminated through a VLEs, such as Blackboard, Moodle and Studynet. It allows



students to access vital information to enhance their learning experience as a student of a university in the UK. In doing so, students can submit their coursework online without the need to print out a copy. Apart from that, technology has allowed students to watch live recorded lectures as well as seminars at the comfort of their homes. Students could also participate in live workshops via programmes such as Adobe Connect and Skype for Business with the intention of improving their understanding of a topic. The question is whether the influx of technology is effectively assisting students in having a good understanding of the subject matter and thus achieving higher satisfaction in their learning experience.

Case Study

There are two case studies being conducted in total. Data has been collected using the end of module feedback. The first data was collected from CULC. It has been used for case study one. At the beginning of the end of module feedback exercise, the administrator will distribute the end of module feedback materials to the students in the class without the presence of any academics. Students will be given twenty minutes to fill in the form without inserting their names. Towards the end of the exercise, the administrator will then collect all the sheets and the information will be processed by the administrator before distributing the results onto a large spreadsheet.

Regarding the end of module feedback materials from UoG, it is being conducted online. Students must use a computer to access the end of module feedback on Moodle. In doing so, students must use their student ID and password to gain entry to the end of module feedback. Data will then be collected centrally without the identification of the students. The collected data will then be feed through a database for the access by academics via a link.

The aim of this study is to provide evidence of whether blended learning will offer a suitable alternative to the more traditional face-to-face teaching for studying a law module. Apart from that, it is also an experiment to gather information as to whether students from different universities will accept blended learning as an effective tool to teach them.

Case Study One

Name of the module: Employment Law (CULC) (Level 6); Nature of the module: LLB; Module code: 305LLB (F04); Module duration: April–June 2015; Number of students: 20

The response rate for this module was 75%. Throughout the duration of the module for a total of 10 weeks, students could gain access to pre-recorded lectures prior to their lessons on Moodle. It will be uploaded on Moodle a week before the lecture commenced. The pre-recorded lectures include quizzes that students were required answer beforehand.

Apart from that, live lectures were also recorded using a mobile phone before editing and then subsequently uploading them onto Moodle. It is recorded with the permission of the students. These recordings are edited live lectures to incorporate multiple-choice questions for the benefit of the students to revise later. The data showed that live lectures are still the preferred method of disseminating information. In return, 53% of the students made specific positive reference to the online lectures which made up one of three things that made the course good in the student's opinion. However, only 6.66% found online lectures not stimulating at all.

During a seminar session throughout the course, students are being taught to provide a good structure when answering questions via face-to-face. Often than not, students are asked to discuss the answers in groups before presenting them in front of the class afterwards. On 3 occasions, students have been asked to do in-class exercises. The students' work will then be assessed and oral feedback (individual or group presentation) as well as a written feedback (in-class exercises) will be provided.

Students took part in online lectures and seminars using Adobe Connect. There were 4 workshops being conducted online. Using Adobe Connect, students will have the opportunity to engage in useful discussions at the comfort of their homes and download the sessions before playing back when necessary.

Key findings

Overall, the module received 100% positive feedback in relation to the methods of teaching, where 53% of the students find that using online learning (e.g. Adobe Connect) helps to increase their level of confidence.

Case Study Two

Name of the module: Company and Partnership Law (UoG); Nature of the module: LLB; Module duration: September-April 2017; Number of students: 30

There were 14 responses or 46.7% of the total number of students took part in the end of module feedback. Students were taught consistently in the same way as those in case study one. They were also subjected to the same teaching methodology as in case study one. The module leader managed to execute 4 online workshops to students and students were given support via Skype.

Key findings

Fourteen students took part in the module feedback. The feedback consists of 5 scales, 0 being the worst and 5 is the best. It received a score of 4.4 for being an interesting module. It shows that most of the students agree that the course is stimulating. Students gave a score of 4.1 as they believe that the way the course is taught has helped them to understand the course content. Students (scoring 4.1) agree that the course has challenged them to do their best. They believed that the course has helped them to enhance skills and knowledge that they will need after graduation (scoring 4.4). Students agree (scoring 4.7) that the assessments have enabled them to demonstrate what they have learned so far in the course. It is not surprised that there are 3 first class student; 18 students with 2:1 mark and 6 students obtained a 2:2 mark for this module.

Future

Perhaps one solution that many, is to encourage more MOOCs for future use. The incorporation of in-class exercises online or offline is in line with the requirements from the Bar Standards Board and the new requirements from Solicitors Regulation Agency (SRA). New examination methods will be introduced in 2019-2020 by the SRA who favours the use of multiple-choice questions and focused on employability. The mode of examination will

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change slightly to incorporate more problem based questions despite receiving lots of criticisms about the new qualification route (G.L., 2016).

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Brief biographies of the author

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He is an enthusiastic law lecturer who intends to promote the use of blended learning among his students. His research is primarily focused on course design and the use of innovative methods of teaching. Although his primary interest is in law, technologicallyenhanced learning has given him a new meaning to teaching.

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Efficiency of R&D Projects – a Case Study

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Abstract

The paper considers the problem of the success of R&D projects being evaluated by its outputs (which can be seen as project success measures) related to its inputs (constituting project success factors). The Data Envelopment Analysis is used, which helps to estimate the efficiency of the projects, defined as the ratio of weighted sum of inputs to weighted sum of outputs. Two different models are applied to a set of R&D projects implemented in Poland. The findings are compared to those already known in the literature. Advantages and disadvantages of the approach are shown. In particular, the problem of quantitative and qualitative criteria of R&D project evaluation is discussed.

Keywords: R&D project, project success, project efficiency, Data Envelopment Analysis **Main Conference Topic:** Academic Research Projects

Introduction

Research and Development (R&D) projects are rather specific Their major features are the variation of their scope and the higher levels of uncertainty and risk connected with their implementation (Lambert 2006). Also, the notion of their success is not unequivocal. The only thing which is clear in this respect has been expressed by Chan and Chan (2004): "There have to be two groups of project success measures: objective measures (such as time or cost) and subjective measures (such as the satisfaction of different project stakeholders)".

In practice, R&D projects have to evaluated at various stages: in calls for proposals, during project implementation and after project closure. The outcome of this evaluation is of high importance for the researchers and research institutions. It has a decisive influence on budgets allocated to research groups and institutions. However, the problem how to asses them has not been solved (Retzer and Jurasinski, 2009). Various criteria are used, usually quantitate ones, but, in view of the above statement by Chan and Chan (2004), also qualitative criteria should be and often are used.

The aim of the paper to examine one approach to project assessment, Data Envelopment Analysis (DEA, e.g. Charnes et al., 1978), which consists in estimating project efficiency, defined as the relation of project inputs to project outputs, and apply it to a set of R&D projects implemented in Poland. The inputs and outputs and their relation is obviously the foundation for any project assessment. The problem is how to choose and how to weight

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them. The goal of the paper is to test various possibilities and indicate their influence on the results using the mentioned case study. Especially, the problem of quantitative and qualitative inputs and outputs will be examined and discussed.

The outline of the paper is as follows: in the next paragraph the DEA method in the context of R&D projects evaluation will be presented, then the methodology and the data used will be described and the results will be presented and analysed. The paper terminates with some conclusions.

DEA method applied to projects - theoretical foundations

DEA can be used to the evaluation of efficiency of different objects, also projects. Objects are supposed to transform inputs into outputs. The inputs represent the resources used and outputs the results obtained. Efficiency is defined as the ratio of weighted sum of outputs to weighted sum of inputs.

Let us suppose we have N objects, and each one transforms R inputs into P outputs. Let us then consider the following model (Charnes et al., 1978), defined for one of N objects, the one with the index i_0 .

$$Max \ g_{i_0} = \frac{\sum_{r=1}^{R} \mu_{ri_0} y_{ri_0}}{\sum_{p=1}^{P} \gamma_{pi_0} x_{pi_0}}$$
(1)

with the constrains:

$$\begin{split} & \frac{\sum_{r=1}^{R} \mu_{ri_0} y_{ri}}{\sum_{p=1}^{P} \gamma_{pi_0} x_{pi}} \leq 1 \\ & \mu_{ri_0} \geq 0, \, r = 1, \dots, R \\ & \gamma_{pi_0} \geq 0 \; p = 1, \dots, P \end{split}$$

where: i=1,...,N is the number of the objects $i_0 = 1, ..., N$ is the number of the object being evaluated at the moment x_{ri} for r = 1, ..., R, i=1,...,N are the input values for the *i*-th object y_{pi} for p = 1,...,P, i=1,...,N are the output values for the *i*-th object.

The maximal value of g_{i_0} is considered to be the efficiency of the i_0 -th object. The decision variables of the model are the weights of the sum of inputs and the sum of outputs. The maximal value of g_{i_0} corresponds to such values of the decision variables. i.e. weights, which allow the i_0 -th object to have the highest possible efficiency. Thus, the weights in (1) can be different for each i_0 -th object.

If an object, in spite of the possibility to maximise its efficiency through the free choice of weights, has efficiency smaller than 1, it means that, as compared to the other objects, it is not efficient – its efficiency could be improved

The DEA method has already been applied to the evaluation of projects, also research projects. The inputs represent the effort and the expertise put into projects, the outputs the results obtained. The literature has used for R&D projects such inputs as e.g. project cost

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(budgeted and actual) and the full time equivalent of highly trained personnel (managers, engineers and scientists, PhD, master, bachelor degree holders) used for the realization of the project. As for the outputs, the following ones have been used for R&D projects, some of them being of the qualitative nature: number and quality of publications, citations, patent commercialization, established companies cooperations, number of PhD degree holders "produced", satisfaction of the project team, of the manager and other stakeholders etc. (Yuan & Huang 2002, Eilat, Golany & Shtub 2008, Hicks 2012).

In the next paragraphs we apply the DEA to a set R\$D projects implemented in Poland, proposing and testing various qualitative and quantitative inputs and outputs. A complementary study on the same set of project was presented in (Gładysz, Kuchta, 2017), but there the choice of inputs was different. The two studies will be compared to each other.

Research methodology and data used

The DEA method was applied to R&D projects implemented in Poland, in all research domains. The data was gathered by means of questionnaires, distributed on line. 68 questionnaires were filled in, however, only 34 completely. This set of 34 completely filled in questionnaires constituted the basis for the study. Each questionnaire was filled in by a project manager of one R&D project, all of the respondents were university assistants or professors.

We used two models, Model 1 and Model 2. Both had identical inputs but they differed in outputs.

The inputs in both models are both quantitative and qualitative. The quantitative ones are as follows:

 x_1 - the number of people in the project team,

x₂ – actual duration of the project [months],

x₃ – actual budget of the project [Polish currency PLN]

Qualitative inputs, assessed subjectively by the project manager in the Likert scale (1-Strongly disagree, 2-Disagree, 3 - Neither agree nor disagree, 4 -Agree, 5 -Strongly), were as follows:

 x_4 – were the human resources in the project sufficient as far as their number was concerned?

 x_5 – did the project team had sufficient expertise as to the content of the project?

 x_6 – was the cooperation in the team good enough?

In the first model (Model 1) only quantitative outputs were selected:

y₁ - number of publications in journals indexed in the Master Journal List,

 y_2 - number of publications in conference proceedings.

In the second model (Model 2) additionally qualitative outputs were taken into account, whose values was assessed subjectively by the project manager in the Likert scale:

 y_{3i} - was the project successful?

 y_{4i} - was the main project objective achieved?

 y_{5i} – were the actual project results conform with the initial assumptions?

 y_{6i} – did the project implementation lead to unplanned results, which were important from the scientific or practical point of view?

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Similar two models were considered in (Gładysz and Kuchta 2017), but the qualitative inputs were omitted. The descriptive statistics of inputs and outputs are presented in Table 1 and 2.

Descriptive	Input										
statistics	Quar	ntitative		Qualitative							
	<i>x</i> ₁	<i>x</i> ₂	<i>x</i> ₃	x_4	<i>x</i> ₅	<i>x</i> ₆					
	People	Duration	Budget	Resources nb	Expertise	Cooperation					
Mean	5.9	36.3	395	4.4	4.7	4.5					
St. Dev.	4.5	11.2	326	1.2	0.8	0.7					
Min	1	12	39	1	2	2					
Max	25	60	1500	5	5	5					

Table 1: Descriptive statistic of the inputs of Model 1 and Model 2

The project teams were composed of 1-25 persons, their mean cardinality was about 6. The project duration ranged from one to five years, with the average of about three years. The number of project team members, their expertise and their cooperation were assessed highly, the lowest assessment was given to the number of project team members. For this input the minimal assessment (1) has occurred, whereas in case of the other two it has not.

Descriptive	Outputs									
statistics	Quantitative	Qualitative								
	y_1 M.J. L.	y ₂ Conf.	y ₃ Success	y ₄ Goal	y ₅ Plan	y ₆ Other results				
Mean	4.9	4.9	4.4	4.6	4.3	4.3				
St. Dev.	7.3	6.4	0.6	0.5	1.0	1.2				
Min	0	0	3	3	1	1				
Max	40	35	5	5	5	5				

Table 2: Descriptive statistics for outputs of Model 1 and Model 2

The mean number of publications both in journals from the Master Journal List and in conference proceedings was about 5. However, the number of publications in journals from the Master Journal List was more diversified than that of publications in conference proceedings.

Results of the research

Summary of the results of applying the general model (1) in two versions (Model 1: quantitative and qualitative inputs and quantitative outputs, Model 2: quantitative and qualitative inputs and quantitative outputs) can be seen in Figure 1.

In Model 2 the efficiencies are on the whole higher, which is natural: a wider set of outputs gives each project wider possibilities to maximise its efficiency through an appropriate choice of weights.

A clear shift to the right in Model 2 can be seen: in this model the efficiency of over 94% of the projects is higher than 0,5, whereas in Model 1 this percentage is equal to 50%. If we take the threshold for the efficiency equal to 0,8, than the percentage of projects with the efficiency higher than the threshold is equal to 47% in Model 2 and to 30% in Model 1. The exact results are shown in Table 3.



Figure 1. Histograms of project efficiencies for Model 1 and Model 2

Project			Inputs						Out	puts			Effici	iency
No.	<i>x</i> ₁	<i>x</i> ₂	<i>x</i> ₃	<i>x</i> ₄	<i>x</i> ₅	<i>x</i> ₆	<i>y</i> ₁	<i>y</i> ₂	<i>y</i> ₃	<i>y</i> ₄	y_5	<i>y</i> ₆	Model 1	Model 2
1	6	36	300000	5	5	5	0	2	5	5	5	4.3	0,10	0,61
2	2	24	99840	5	5	5	5	0	5	5	5	1.2	1,00	1,00
3	3	30	108000	5	2	4	0	7	3	4	4	1	0,92	1,00
4	3	27	50000	2	5	5	5	3	5	5	4	5	1,00	1,00
5	5	13	39000	4	5	4	0	2	4	5	4	5	0,73	1,00
6	7	36	205000	5	4	4	5	0	4	3	2	5	0,55	0,61
7	3	24	99000	5	5	4	3	2	4	5	5	1	0,52	1,00
8	10	36	400000	5	5	5	9	7	5	5	5	5	0,57	0,69
9	2	26	68000	2	5	5	1	4	4	5	4	4	0,84	1,00
10	4	48	750000	5	5	5	7	4	5	5	5	5	0,42	0,63
11	7	12	120000	5	5	4	2	3	5	5	4	4	0,40	1,00
12	1	36	140000	2	4	4	3	0	5	5	4	5	0,78	1,00
13	7	36	913000	5	5	2	4	15	4	5	5	4	0,86	0,76
14	10	46	860000	1	5	5	4	8	4	5	5	5	<u>1,00</u>	<u>1,00</u>
15	4	30	325000	5	5	5	2	6	4	5	5	4	0,34	0,84
16	3	24	100000	5	5	4	1	2	4	4	4	1	0,29	0,82
17	4	36	230000	5	5	5	6	0	5	5	5	5	0,62	0,68
18	15	52	1500000	4	4	4	40	0	4	4	4	2	<u>1,00</u>	<u>1,00</u>
19	3	48	336000	5	4	5	1	0	4	4	4	5	0,10	0,57
20	7	36	335000	5	5	4	3	3	5	5	5	2	0,13	0,59
21	5	36	516000	4	5	5	1	3	4	4	2	4	0,50	0,78
22	25	57	440000	5	5	5	3	11	4	4	5	5	0,12	0,26
23	4	24	100000	4	5	5	2	1	5	5	4	5	0,33	0,89
24	10	36	460000	5	5	5	2	1	5	5	5	4	0,17	0,55
25	5	48	600000	5	5	5	3	5	5	5	5	5	0,55	0,71
26	4	48	450000	5	5	5	3	12	4	4	4	5	0,36	0,65
27	4	60	1000000	1	2	5	4	6	4	5	4	5	<u>1,00</u>	<u>1,00</u>
28	3	36	268518	5	5	5	2	10	4	4	1	5	0,11	0,71
29	7	42	290000	5	5	5	1	1	5	5	5	2	0,16	0,53
30	8	36	499200	5	5	4	2	3	4	4	5	5	1,00	<u>1,00</u>
31	7	48	540000	5	5	5	19	35	5	5	5	5	0,11	0,46
32	3	44	642000	5	5	5	2	3	4	4	4	5	<u>1,00</u>	<u>1,00</u>
33	10	36	280000	4	5	4	15	8	5	5	5	5	0,51	0,62
34	6	39	693220	5	5	4	6	2	4	5	5	5	0,32	0,61

Table 3: Inputs, outputs and project efficiencies

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Let us analyze closer selected examples from Table 4.

- a) Projects fully efficient in both models: 2,4,14,18,27.30,32. First, let us compare these results with those from (Gładysz, Kuchta 2017), where the same sample and very similar models were concerned: the only difference was the absence of qualitative inputs. The set of fully efficient projects in both models in (Gładysz, Kuchta, 2017) is the same, apart from projects 14 and 27, which were not efficient in (Gładysz, Kuchta 2017). This means that these projects are assessed better if qualitative inputs are taken into account. Indeed, these projects are the only ones where the project team was judged not to be sufficient as far as the number of project team members is concerned. Additionally, the expertise of the project team was not judged to be sufficient either. And in spite of this the projects attained good results: in terms of the number of publications of both types and in terms of qualitative outputs. In (Gładysz, Kuchta 2017) these two projects had a lower efficiency, because they had a relatively long duration and high budget. But taking into account two negative qualitative features of the project team.
- b) Projects fully efficient in Model 2, but not fully efficient in Model 1: 3,5,7,9,11,12. Let us disregard project 3, in which case the difference in the two models is not high. Projects 5 and 9 are not efficient in case of Model 1 because of the lack or small number of publications in journals from the Master Journal List, it is only the qualitative assessment of their outcome which allowed them to become efficient. The difference in efficiency between Model 1 and Model 2 of project 12 is due to a similar reason, but concerning the publications from the conference proceedings. Projects 7 and 11 are not fully efficient in Model 1, because they have very high qualitative assessment of the input: the project team was judged to be very good in terms of members number, expertise and cooperation, and the quantitative output was not excellent. It is only the high qualitative assessment of the output in Model 2 which made these projects fully efficient.
- c) Projects not fully efficient in any model and whose efficiency in Model 2 exceeds that from Model 1 by at least 0,4: projects 1,15,16,19,20,23,28. In case of these projects the possibility to assess their outcomes in a qualitative way increased the efficiency considerably, even if it did not make them fully efficient. The problem is that all these projects have a rather good input: a big team judged as very good in all the considered qualitative aspects, a long duration, a high budget, but their outcome in terms of publications was not very high. It is only due to the high qualitative assessment of the ouputs that their efficiency could be judged as higher.
- d) Projects whose efficiency differs in both models by at least 0,5: project 1,11,15,16,23,28. In case of these project the introduction of qualitative outputs has a very strong influence on their efficiency. They have to be analyzed in more detail. Is the discrepancy between the quantitative and qualitative assessments of their outputs justified? Does that mean that the importance of the quantitative assessments expressed by the number of publications of different types is not always a good assessment criterion? Or maybe the subjective judgments of project managers is too highly biased, i.e. the project managers assess their projects too highly?
- e) Projects whose efficiency differs by at least 0,2 between Model 1 from (Gładysz, Kuchta, 2017) (without qualitative inputs) and Model 1 in this paper or between Model 2 (Gładysz, Kuchta, 2017) (without qualitative inputs) and Model 2 in this paper are presented in Table 5.

		Efficiency										
Project No.	Model 1 in (Gładysz, Kuchta, 2017)	Model 2 in (Gładysz, Kuchta, 2017)	Model 1 here	Model 2 here								
9	<u>0,04</u>	1	0,84	1								
10	<u>0,84</u>	<u>0,75</u>	0,42	<u>0,63</u>								
12	<u>0,4</u>	1	<u>0,78</u>	1								
14	<u>0,49</u>	<u>0,5</u>	<u>1</u>	<u>1</u>								
15	<u>0,18</u>	<u>0,48</u>	<u>0,34</u>	<u>0,84</u>								
27	<u>0,57</u>	<u>0,15</u>	<u>1</u>	<u>1</u>								

 Table 5: Selected project efficiencies in models from (Gładysz, Kuchta, 2017) and from

 the present paper

These projects efficiency is very sensitive to the qualitative inputs. If these inputs are judged highly, they decrease the efficiency, if they are assessed lowly, they increase it. Again, these project should be analyzed in more detail. If for example the low qualitative judgement of the inputs is justified, the increase of efficiency should be accepted. But it is also possible that the project manager expresses by means of his judgment his negative emotions and not the objective state of affairs.

- f) Projects fully or almost fully efficient in both models in both papers (they are efficient at least to degree 0,9 in all the four models): project 2,3,4,14,18,30,32. Here all the models deliver almost the same results: these project are definitely better than the other ones.
- g) Projects which are inefficient according to both models in both papers (where the efficiency in all the models is less than 0,5): projects 22 and 31. These projects were not able to defend themselves in any model, they are clearly inefficient.

Conclusion

In the paper two DEA models were applied to a set of R&D projects implemented in Poland. The models constitute a proposal of various sets of inputs and outputs which can be used to asses R&D projects. The choice of them is still an open question. Also an open problem is the choice and interpretation of qualitative, subjective inputs and outputs. It is often emphasized by researchers that qualitative criteria are not enough in case of R&D projects, which clearly differ from e.g. a bridge construction project. On the other hand, subjective assessments are biased by the evaluators emotional and social situations.

The sensitivity of DEA results to the choice of inputs and outputs of R&D projects has been proved in this paper. The final evaluation of some of the examined projects is not clear. And still, a set of projects can be indicated whose assessment seems unequivocal: all the used models gave the same or similar results. The other projects have to analyzed more in detail. Thus, the DEA analysis based on the criteria proposed here can be useful to separate R&D projects whose assessment does not leave any doubt from those where there is a discrepancy in assessments. This discrepancy is of a considerable informative value: it indicates the projects where the objective indicators based assessment differs from the subjective one. This

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difference should be interpreted, which may give rise to a better understanding of the nature of those and generally all R&D projects.

Further steps have to consist in considering other case studies and other sets if inputs and outputs. But on the whole it seems to be clear that the DEA is a promising approach to the assessment of R&D projects.

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Academic and Educational Profiles of Mathematics Teacher Educators

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Abstract

In this presentation, we focus on the academic and educational profiles of mathematics teacher educators (MTEs) employed in Turkish universities. The data for this study are composed of the Curriculum Vitae (CV) of those who work in a university, hold a doctoral degree and had teaching responsibilities for mathematics teacher preparation programs. The target population was emailed to obtain updated CVs of the participants. Out of 256 academics meeting our conditions, we managed to obtain 206 CVs. We examined the written documents of the MTEs in terms (1) education backgrounds, (2) teaching experience and (3) research experiences. Our analysis showed that 53% of the MTEs hold a PhD degree in mathematics education while 42% obtained PhD degrees in pure mathematics. Almost half of the participants did not have any teaching experience other than lecturing at a university. Holders of PhD in mathematics education appear to more actively produce publications and join conferences than the ones studying pure mathematics. The results were discussed with regard to educational practices of MTEs and the rationality of employing mathematicians for teacher preparation programs.

Keywords: Academic profile, Academic titles, Mathematics teacher educators, Research profile

Main Conference Topic: Education, Teaching and Learning

Introduction

Mathematics education is of great importance for the societal advancement and inclusion. This importance has long been realized by educators and policy-makers alike. It is probably due to this awareness that mathematics education research community has historically paid much research attention to the students' mathematical achievement and understanding (Husen, 1967). The research in this direction took into consideration cognitive, affective, social, cultural and historical variables. The results in one way or another relate the student understanding and performance, among other things, to mathematics teachers. Not surprisingly, hence, teaching profession in general and mathematics teachers in particular has become a topic of heated debates especially starting from the 1980s. The research since then has now well established that teachers are one of the most important factors in making a difference in students' mathematical achievement (e.g., Hattie, 2003; Chetty et al., 2013). Understandably hence educators, policy-makers and governments all around the world are much concerned with the quality of mathematics teachers.



Despite the increasing number of research undertakings on the teachers, there appears very little research attention paid to those who teach teachers; that is, mathematics teacher educators (MTEs). Surely, MTEs contribute greatly to the quality of mathematics teachers during at least the course of preparation period. Yet, we know very little about this group (see Superfine & Li, 2014; Goodwin et al., 2014). In recent years, however, teacher educators in general and MTEs in particular began to attract serious research attention. In 2013 AACTE Annual Meeting, Journal of Teacher Education's (JTE) Major Forum, for instance, held a discussion on the current state of and the future projections for the preparation of teacher educators. Further to this, in 2014, JTE published a special issue (v.65, n.4) with a focus on Professional Development and Practices of Teacher Educators.

Despite such research attempts, there are still many questions that deserve attention such as: who are mathematics teacher educators and how are (and/should) they (be) prepared for the job? What qualifications MTEs should or do have? How do MTEs develop a sense of their professions and professional duties? What practices do (or should) MTEs perform to bring up responsive and effective teachers of mathematics? What kind of knowledge do MTEs need to have? What are the MTEs knowledge sources in coming to know the practice of (effective) mathematics teachers? What kind of teaching and/or academic duties should be given to MTEs? How do MTEs decide what to teach and in what ways to arrange teachings?

Apparently all these questions are important. Working to answer these questions would definitely enrich our conceptual horizon as well as deepen our understanding of mathematics teachers' effectiveness. However, before an attempt to answer these questions or some others unstated here, we believe it useful to determine the current state of mathematics educators in certain respects such as educational and training backgrounds as well as research and teaching experiences. Such documentation, we feel, would constitute a fine first step to get to know MTEs and further research can be designed on this basis.

With this in mind, we, in this study, aim to examine the academic and educational profiles of MTEs working in Turkish universities. Please note that we use the term teacher educators while referring to those who work in a University, hold a PhD degree and have teaching responsibilities for pre-service mathematics teacher programs. In our examination, we particularly focus on three dimensions: (1) Education backgrounds, (2) teaching experiences gained in an institution other than university, and (3) research experiences as reflected in publications, projects and postgraduate supervisions.

Method

This is a descriptive study as we aim to portray academic and educational profiles of MTEs in Turkey. The data for this study are composed of the Curriculum Vitae (CV) of the MTEs working in Turkish Universities. The study adopts a document analysis method as the collected CVs were subject to close scrutiny. Data for the study was collected in 2014 and the data collection took place electronically through emails.

Data collection process was completed in four stages. In the first stage, all the Turkish universities were listed and those with Education Faculties were separated. At the time of data collection, there were 193 higher education institutions in Turkey. In Turkish higher education system, there are two different departments within the Faculty of Education offering mathematics teacher preparation programs at primary and secondary levels. In this study, we preferred to focus on primary mathematics education programs and hence the members of staff in this department were the subjects of this study. This is particularly



because these departments are much more common and hence the number of staff are far higher. We determined 65 universities with primary mathematics education departments.

Second, as we aim to reach at the whole population, all the members of staff working in the departments of primary mathematics education were determined through the examination of web sites. We particularly focus on the PhD holders and those with teaching responsibilities. As a result, determined number of academics with the rankings was as follows: 24 professors (Prof), 56 associated professors (Ascprof) and 176 assistant professors (Astprof).

Third, we have obtained email addresses of the all MTEs via faculty websites and dropped email three times with 2-3 weeks time intervals. Each email was sent directly to the person in their names. In the emails, we informed the MTEs about the purpose of our study and requested to send us an updated version of their CVs. Through the exchange of emails, 206 MTEs returned us with their CVs. Hence these MTEs were determined as the participants of the study.

Finally, the CVs were skimmed and scanned to see if all the fields of required information was existent in the documents. If not, then we re-emailed the relevant academics to provide us with the missing information. During this email exchanges, some of them did not provide the required information (such as teaching experience other than university and the duration). Therefore, in the "findings" section there are differences in the number of informants in different analysis categories.

The collected CVs were examined in terms of:

- Academic ranks
- Educational backgrounds
- Teaching experience
- Published articles and conference presentations
- Supervision experience
- Project experience

In what follows we share the findings of our examination with regard to these variables.

Findings

The examination of higher education institutions in Turkey revealed that there were 65 universities offering undergraduate programs in primary mathematics education. Of these, 16 offered master programs in the same department and 9 universities did have doctorate programs. The MTEs working in these programs are classified according to their academic titles in Table 1 below.

Academic titles	State Universities	Private Universities	Total
Prof.	20	4	24
Ascprof.	53	3	56
Astprof.	155	21	176
Total	228	28	256

Table 1: Distribution of MTEs across academic titles

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As can be seen from Table 1, there were 256 MTEs working in the department of primary mathematics education. All the MTEs held tenure or tenure-track positions. The majority of the MTEs were employed in assistant professor positions. Graduated programs and degrees obtained by the MTEs are presented in Table 2 below.

	Mathematics Education		(Pu Mathe	ire) matics	Other instru	Total	
	f	%	f	%	f	%	f
Undergraduate	94	46	104	50	8	4	206
Master	88	48	85	46	10	5	183
Doctorate	103	53	82	42	10	5	195

Table 2: Graduations and Degrees of MTEs

Most of the MTEs were graduated either from Mathematics education or mathematics department and distribution between the two is almost the same (app. %50). While the education level increased, the percentage of pure mathematics-related degrees was decreasing. 82 of the MTEs held a PhD degree from the (pure) mathematics department and hired in teacher preparation programs. Against this background information, findings on MTEs' teaching and research experiences are presented in Table 3 below.

E	Academic	Y	es	N	0	Total
Experience	titles	f	%	f	%	f
Teaching	Prof.	8	67	4	33	12
experience	Ascprof.	17	47	19	53	36
other than	Astprof.	46	55	37	45	83
university	Total	71	54	60	46	131
	Prof.	19	95	1	5	20
Master	Ascprof.	39	98	1	3	40
expervision	Astprof.	54	68	25	32	79
	Total	112	81	27	19	139
	Prof.	19	95	1	5	20
Doctorate	Ascprof.	19	49	20	51	39
expervision	Astprof.	11	16	58	84	69
	Total	49	38	79	62	128
	Prof.	13	93	1	7	14
Project Experience	Ascprof.	37	90	4	10	41
	Astprof.	68	89	8	11	76
	Total	118	90	13	10	131

Table 3: MTEs' experiences of teaching and research

As seen in Table 3, 54% of the all MTEs had teaching experience gained in an educational institutions other than university. Yet, 46% had no real classroom experience as teachers. This rate is the highest for the MTEs with associated professor position. Full professors are the group that the rate of teaching experience is the highest.



Majority of the MTEs had the experience of supervising master studies, that is a remarkable 81%. However, regarding the experience of doctorate supervision, the rate is incomparably low with 38%. However, understandably, assistant professors are the group, which had the lowest experience rate of doctorate supervision; only 16% of this group did lead a PhD thesis. In terms of project experience, 90% of all MTEs appeared to have involved in a project in different positions but mainly as a researcher.

Along with their experience, MTEs were also investigated in terms of their publications. Table 4 below presents MTEs' publications in journals and conferences.

	Academic		Mathe	matics ed	lucation	Pure	mathen	natics
Publications	titles	Platform	f	%	\overline{X}	f	%	\overline{X}
	Prof.	National	96	72	6	38	28	2,4
	(N=16)	International	73	24	4,6	227	76	14,2
Articlos	Ascprof.	National	238	94	6,6	15	6	0,4
Articles	(N=36)	International	258	49	7,2	273	51	7,6
	Astprof.	National	216	89	2,7	26	11	0,3
	(N=80)	International	264	63	3,3	157	37	2,0
	Prof.	National	92	64	5,8	52	36	3,3
	(N=16)	International	51	66	3,2	26	34	1,6
Conference	Ascprof.	National	340	83	9,4	68	17	1,9
presentations	(N=36)	International	394	86	10,9	63	14	1,8
	Astprof.	National	320	84	4	59	16	0,7
	(N=80)	International	499	88	6,2	70	12	0,9

Table 4: MTEs' publications in journals and conferences

Table 4 shows that MTEs with a degree in pure mathematics tend to publish more in international journals rather than national journals. On the other hand, those working in mathematics education tend to publish in both of the avenues. When the number of academic productions in pure mathematics is compared with that of mathematics educations, one can see a clear decrease in the number and in the rate towards the title of assistant professors. That is, while professors gave much of academic productions in pure mathematics, assistant professors produce more in mathematics education both at national and international levels. While there is a balance for the associated professors in terms of international publications, when it comes to national publications, mathematics education are far more than the national publications in pure mathematics.



This observation also holds for the conference attendances as well. MTEs with a degree in mathematics education tend to attend both national and international conferences much more than those with a degree in pure mathematics. Hence MTEs seem to be more actively taking part in events related to mathematics education rather than pure mathematics. This we believe is particularly noteworthy given the share of pure mathematicians among the MTEs employed in faculties, that is 42% (see Table 2).

Discussion

The findings of our analysis suggest that 42% of participating MTEs pursued a degree in pure mathematics while 53% got their PhD degrees in mathematics education. This finding raises some important questions. For instance, how well equipped are those who obtained degrees in pure mathematics to meet the demands and needs of primary teacher preparation programs? In fact, an answer to this question is not straightforward. In the USA, the Association of Teacher Educators (ATE, 2008) determined certain standards for teacher educators, including, but not limited to, cultural competence, scholarship, professional development and program development. In Netherlands, similar, but not identical, standards are also set for teacher educators such as competencies in content, pedagogy, communication and personal growth (Murray & Male, 2005). We may add different skills to this list. Then, the importance of the above-posed question becomes far too apparent. It is true that those with a degree in mathematics are expected to have sound content knowledge and hence could be expected to teach mathematic courses. Further to this, as our findings suggest they have had experience in research, from which we can assume that they have scholarship as well. But how do they develop some other crucial skills such as pedagogy to model teacher candidates (Smith, 2005). When we realize that even those with a degree in field education have difficulties to meet the demands of teacher preparation since obtaining a degree in field education does not necessarily prepare teacher educators to their profession (see, for instance, Goodwin et al., 2014). This is because during the course of doctoral studies, teacher educators develop a very specific area of expertise and in fact doctoral process is perceived as a developmental stage of certain academic/scientific skills rather than practical business of teacher training. Hence this situation calls for a re-consideration of the state of pure mathematicians employed in teacher training programs. This is particular the case in Turkish context with such a large population of mathematicians taking part in preparation programs.

Another important finding of our analysis is related to teaching experience of MTEs. The results suggest that nearly half of MTEs (46%) employed for primary teacher preparation did not have any teaching experience other than university. The question here is how important to have teaching experience for MTEs? At this point, we find useful Cochran-Smith and Lytle's (1999) articulation of "relationships of knowledge and practice" (p.249). The authors distinguish three prominent conceptions of teacher learning; that is, knowledge-for-practice, knowledge-in-practice and knowledge-of-practice. In this regard they state that

knowledge-for-practice . . . as formal knowledge and theory . . . knowledge-in-practice . . . is what many people call practical knowledge . . . embedded in practice and in teachers' reflections on practice . . . knowledge-of-practice . . . is generated when teachers treat their own classrooms and schools as sites for intentional investigation (p. 250)

MTEs without teaching experience is lacking in knowledge-in-practice, which certainly important for MTEs to achieve an effective teacher preparation. However, the authors argue that the deficiency of this knowledge might be compensated with knowledge-of-practice. This brings us to the issue of scholarship and to the kind of research designed and conducted



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by the MTEs. If the MTEs design instructional experiments and try out in real classrooms for research purposes then they could gain both knowledge-for-practice and knowledge-inpractice. However, it is not quite likely to expect all MTEs to perform research in such a way. Hence, lacking of teaching experience seems to be a challenge and might in fact create subtle obstacles to carry out effective preparation programs. However, the assumption that "a good teacher will also make a good teacher educator" (Korthagen et al., 2005, p.110) does not hold neither. In fact research has already made progress in showing that transition from being teacher to getting teacher educator is full of challenges including identity formation, adaptation to the new roles, cultures and norms and becoming researchers (see, Murray & Male, 2005). Hence, although usefulness of teaching experience and difficulties involved in its absence appear to be commonsense, there is more to this issue than meets the ears. We believe that the researchers, governing bodies as well as universities need to develop policies with regard to past and on-going teaching experiences of MTEs in real classrooms.

All these considerations in fact indicate the necessity of a reevaluation of multi-faceted issues with regard to MTEs, including, but not limited to, preparation of MTEs, their employment, assignment, minimum requirements and job definitions. Research on teacher educators in general and MTEs in particular have not fared so long as to perform such reevaluations. However, increasing research interest in this area promises a fruitful potential. Our study, in this respect, helped us get to know and hence provided an initial step towards achieving a better understanding of this group, at least in Turkish context. We believe that interested parties would certainly benefit from similar studies performed in different countries so that we could document the profiles of those who prepare future teachers.

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Traditional Versus Agile Scheduling and Implementation of R&D Projects – a Case Study

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Abstract

The paper considers the problem of scheduling R&D projects. First, it discusses their peculiarities with respect to other project types, especially the uncertainty linked to R&D projects. Then it presents elements of traditional project scheduling and implementation and of their agile counterparts. The traditional approach, as it is required in applying for R&D project financing, is used in practice. Its disadvantages are shown using a real world R&D project. Then the application of the agile approach is simulated using the same R&D project. Its advantages are shown and its limitations are indicated.

Keywords: R&D project, project scheduling, agile project management **Main Conference Topic:** Academic Research Projects

Introduction

Research and Development (R&D) projects are rather specific in nature. Their main feature is the difficulty to predict their course and their outcome, especially in case of R&D projects where the outcome depends on the results of some experiments or on the answer to a research question where many radically different answers are possible. That is why it is difficult to plan such projects. Of course, each project has to be planned, but in case of R&D projects it often happens that these plans have little to do with reality (Kuchta et al., 2017).

The aim of the paper is to use a real world R&D project to justify the following statement: R&D projects should be scheduled in a different way than "traditional" projects, where the term "traditional" refers to projects in which the goal, the expected product, the methods and the tasks to be performed are almost fully known (e.g. a bridge construction project). More exactly, the goal of the paper is to justify the statement that R&D projects should be scheduled in the agile way, like many IT projects nowadays. Of course, some disadvantages of this approach will be pointed out too, but in the authors opinion the advantages prevail and the application on this kind of planning should be considered in practice.

The outline of the paper is as follows: in the 2. Section R&D projects will be briefly characterised. In the 3. Section the traditional and the agile approach to scheduling will be presented in a simplified way. In the 4. Section the real world R&D project will be described,

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together with its actual schedule, worked out according to the traditional approach, together with its course and general outcome, which cannot be judged positively. In the 5. Section the agile approach to the scheduling of the same project is simulated in a post factum experiment. The advantages and limitations of the agile approach are discussed.

Distinctive features of R&D projects

R&D project can be defined, for example, in the following way (Katz, & Tushman, 1979): "they are projects which usually involve the creation, evaluation and/or refinement of some process, service or product". In the literature they are characterized by a large degree of risk (defined as events which might have a negative influence on the project outcome and which can be identified before they occur and estimated with respect to their impact and probability) and uncertainty (defined as events which might have a negative influence on the project outcome and which cannot be identified or estimated with respect to their impact or probability) (Lambert, 2006), (Turner, & Cochrane, 1993), (Kuchta, 2014). In research projects often the goals and/or the methods are not fully known before the project start, or, even if at the beginning they seem to be known, it often occurs during the project implementation that in fact they were not (Turner, & Cochrane, 1993), (Kuchta, & Skowron, 2016), (Kuchta et al., 2017). That is why often the initial schedule turns out to be completely useless (Kuchta et al., 2017). Thus, there is an open question how to schedule R&D projects. This paper is an attempt to give an initial answer to this question. Two approaches to scheduling will be compared: the traditional and the agile ones.

Traditional project scheduling and traditional project implementation versus agile project scheduling and project implementation

In traditional project planning (PMI, 2013), required in calls for proposals, where researchers apply for financial resources for the implementation of R&D projects, we have to make the following steps (presented below in a simplified way):

- 1. Formulate the project goal;
- 2. Elaborate a Work Breakdown Structure which in a hierarchic presentation of the work scope in the project, where more and more detailed numbering is given to more and more detailed description of work packages;
- 3. The lowest level of Work Breakdown Structure are project tasks. Determine the necessary precedence requirements, i.e. identify which tasks have to be finished in order for other tasks to be started.
- 4. Assign resources to the tasks and determine the number of resources available.
- 5. Work out a task schedule, using any scheduling procedure, for example the serial scheduling procedure (it takes each task one by one and finds for it the earliest possible start, considering both the precedence relations and the resource availability).

Than a risk analysis is performed, which comprises the identification and evaluation of the most important events which might negatively influence the project outcome. Also events caused by various stakeholders (Davis, 2014), some of which may constitute a threat to the project, are identified and estimated. Mitigation measures are projected, but the schedule of tasks remains to a large degree untouched. No uncertainty analysis is usually performed.



An important goal in the traditional project implementation is keeping within the initial schedule.

In agile project planning (Szőke, 2011), presented here in a simplified way, we conduct the following steps:

- 1. Formulate the project goal, as far as it can be formulated in this stage;
- 2. Identify the tasks (functionalities) to be performed, formulate their description in such a way that it identifies the stakeholders interested in the outcome of the task;
- 3. Link each task to a "business priority value", expressing the importance of the task for the stakeholders. Tasks which should be implemented sooner get a higher priority value;
- 4. Assign to ach task a workload (e.g. in hours or another unit);
- 5. Select the tasks to be performed in the next few weeks (for the next iteration or, as is usually called, sprint), choosing the tasks with the highest priority value, but observing their workload and the resources available in the sprint;
- 6. After each iteration an iteration analysis is conducted, together with the key stakeholders, and then the next iteration is planned, taking into account the conclusions drawn from this analysis.

An important goal in agile project implementation is the earliest possible satisfaction of stakeholders, in terms of delivering them as early as possible the highest possible value.

In step 5 we can use (Szőke, 2011) an optimization model, called knapsack problem (Sysło, Deo, & Kowalik, 2006). In this model there is a knapsack with a limited capacity, which corresponds in the agile approach to the workload available in the sprint. A selection of available objects has to be placed in the knapsack. The objects have both a volume (thus consume the knapsack capacity) and a value. The set of objects to be put in the knapsack has to be selected in such a way that the selected objects have a total volume smaller or equal to the knapsack capacity but their total value is as high as possible. In the agile approach we should select for the nearest sprint such a selection of tasks that the necessary workload to perform them does not exceed the sprint available capacity and their total priority value is as high as possible.

Of course, the precedence relations, defined in the traditional approach (Table 1), have to be taken into account, but each time when a high priority task can be performed breaking the precedence relation, it is checked whether it is possible after all. Thus, the precedence relations are broken each time it is possible and it is advantageous from the point of view of the priority value delivered to the stakeholders.

Traditional project scheduling and implementation of a selected R&D project

In Table 1 we can see the authentic schedule of a R&D project, whose aim was to elaborate a costing system for universities, initially implemented and verified at one selected university, called University X. This costing system was meant to deliver costing information about all cost objects at universities whose cost is of importance to different decision makers. These cost objects are: students of various degrees and faculties, courses, student groups, faculties, departments, projects, laboratories etc. The elaboration of the system was to be based on a detailed analysis of University X: of its cost, its accounting system, the entries in individual accounts, the organizational structure, syllabuses, data on implemented R&D projects, cost structure etc. The system was meant to be verified using the same university and its data as entries and the university decision makers (deans, presidents, heads of various



organizational units, financial managers, decision makers in various fields of university activity etc.) as evaluators of the usefulness of the proposed system with respect to the current

activity etc.) as evaluators of the usefulness of the proposed system with respect to the current one.

The project was financed by a state research financing institution which required the traditional approach to project scheduling and implementation. Table 1 presents the actual schedule of the project, elaborated in the application for financing.

The starts and ends in Table 1 are expressed in the number of the month of project duration minus 1, thus moment 0 means the beginning of the 1^{st} month of project realization.

Task code	Task name	Start	End	Prede- cessors
1	Preparation of the project implementation	0	2	
1.1	Elaboration of the project plan and settling the milestones			
1.2	Determination and ensuring the required resources			1.1
2	Analysis of the functioning of University X	2	4	1
2.1	Understanding the logic of university functioning			1.2
2.2	Analysis of the organizational structure of University X			2.1
2.3	Defining potential data sources			2.2
2.4	Determination and analysis of the current cost structure and content			2.3
3	Elaboration of the model concept	4	12	2
3.1	Definition of the basic model elements			2.4
3.2	Construction of the conceptual model of cost flow			3.1
3.3	Carrying out questionnaires based study			3.2
3.4	Validation of the adopted concept			3.3
4	Analysis of the IT environment	12	14	3
4.1	Analysis of the existing IT environment of Polish universities			3.4
4.2	Determination of the requirements which have to be			4.1
	fulfilled by the IT environment			
4.3	Survey of the available software fulfilling the requirements			4.2
4.4	Elaboration of a plan of IT environment development for			4.3
	University X in the context of cost management			
5	Implementation of the system in selected areas of	14	22	4
	University X			
5.1	Selection of the areas of University X and their preparation for the implementation			4.4
5.2	Adaptation of the model to the needs of the implementation			5.1
	in individual selected areas of University			
	X			
5.3	Implementation of the model in the selected IT environment			5.2
5.4	Implementation of the model in the selected areas of University X			5.3
6	Analysis, verification and publication of the results	22	24	5

Table 1: Traditional project plan: the task numbers correspond to the code in the WorkBreakdown Structure



In the risk and stakeholder analysis performed all the risks were classified as acceptable, because the project team was persuaded that their expertise and interpersonal qualities were sufficient to overcome possible obstacles. No uncertainty analysis was conducted.

When the implementation of the projects started, during the execution of task 2 (the beginning of the 3^{rd} – the end of the 4^{th} month) it became clear that it was going to be very difficult to obtain the needed information and to make respective decision makers and staff members be interested by the project. Still, the work on the project was going on and the project team used all their personal contacts and persuasion abilities to change the attitude of persons needed for the project success. Unfortunately, till the end of the 12th month no significant change has been attained in this respect. But the project had to be continued according to the initial schedule, as required by the traditional approach and the financing institution. Unfortunately, the necessary data was made available in a very small scope and most of the main projects stakeholders remained uninterested and unwilling to spend time on the project and its results and to reveal the necessary data. Ultimately, the scope of the project had been changed considerably. This happened only in the second year of the project implementation. The project was limited to a very restricted area of University X (mainly to the teaching process of two of 20 faculties). Another university, University Y, was included, but this university conducts no research (but only teaching) and has a very simple structure, so the results and conclusion are not relevant for larger universities. So, it has to be said that the project was an almost failure, if the initial goals and scope are taken into account.

Post factum, a simulation was conducted of how the agile approach to the analysed project would have possibly changed the project outcome.

Simulated agile project scheduling and implementation in the selected R&D project

In the agile project planning each task has to be defined and analysed taking into account its value and importance in the eyes of stakeholders, which was not required in the traditional approach. In Table 2 we present the simulated agile analysis of the project tasks – the project manager was asked to place herself in the time right before the project start and try to give the information which was available at that time. The abbreviations for stakeholders have the following meaning:

- FD: Financial Department of University X
- MA: main accountant of University X
- FM: financial manager of University X
- PR: President and vice presidents of University X
- FI: the financing institution of the project
- D: deans of University X
- PM: the project manager
- PT: the project team.

The hyphens in Table 2 mean that we are dealing with summary tasks - the analysis was made for the tasks on the lower level of the Work Breakdown Structure.

The x's mean that the task and the stakeholder concerned influence or may potentially influence each other in a significant way. The workload is the estimation of the work needed to execute the task in assumed units, according to the agile approach. They reflect the effort



needed to execute the task. The priority value, given by the project manager, reflects the importance in the eves of the stakeholders of an early execution of the task. The priority

importance in the eyes of the stakeholders of an early execution of the task. The priority value reflects both the importance of the task and the risk and uncertainty linked to it. If the risk or uncertainty is high, it is better to execute the task early, so that there is time to solve potential problems.

			Work	Prio-						
	FD	MA	FM	PR	FI	D	PM	РТ	load	rority
1	-	-	-	-	-	-	-	-	-	-
1.1							х	х	1	1,5
1.2							х	х	1	1,5
2	-	-	-	-	-	-	-	-	-	-
2.1	х							х	5	3
2.2								х	1	3
2.3							х	х	5	8
2.4	х	х	х	х				х	5	10
3	-	-	-	-	-	-	-	-	-	-
3.1	х							х	13	0,8
3.2	х		х					х	13	0,8
3.3	х		х					х	2	3
3.4	х		х					х	21	1,3
4	-	-	-	-	-	-	-	-	-	-
4.1				х				х	3	0,6
4.2								х	8	1,5
4.3								х	8	1,5
4.4	х	х						х	13	2,4
5	-	-	-	-	-	-	-	-	-	-
5.1	х	х	х	х		х	х	х	13	8
5.2			х	х				х	21	1,3
5.3	х	х	х					х	21	1,3
5.4	х	х	х	х		х	х	х	34	2
6					х		x	x	10	2,5

Table 2: Agile approach to project planning: main stakeholders, priority value and workloadfor each task

Then, according to the agile approach, the effort possible to apply in the next iteration, whose duration was assumed to be two months, was evaluated in the assumed units. It was estimated to be equal to 35.

Finally, using a model based on the knapsack model, the tasks to be executed in the first sprint were selected. They were: 1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 3.3, 4.1, 5.1. Thus, it turned out to be possible to break some of the precedence relations from the traditional approach (Table 1).

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				Stakeh	olders				Work	Prio-
	FD	MA	FM	PR	FI	D	PM	PT	load	rority
1.1							х	х	1	1,5
1.2							х	х	1	1,5
2.1	х							х	5	3
2.2								х	1	3
2.3							х	х	5	8
2.4	х	х	х	х				х	5	10
3.3	х		х					х	2	3
4.1				х				х	3	0,6
5.1	х	x	х	х		х	x	х	13	8
total									35	37,1

Table 3: Task selected for the 1.sprint (1. and 2. month) and their characteristics

In the traditional approach only tasks 1.1 and 1.2 were planned for the first two months of the projects. It was due to the fact that in the traditional approach we do not start the scheduling procedure with the question "which workload can we spend on the project in the given sprint"?, but with the question "which tasks can be scheduled in the period considered taking into account the precedence relations (Table 1)?". The total priority value of those two tasks is 3 and the only stakeholders affected by the two tasks or affecting the two tasks are the project manager and the project team. Thus, the project team in the first two months had no interaction with the other stakeholders and it could not receive the warnings linked to the attitude of various stakeholders.

In the agile approach, first of all, it became possible to plan for the first two months of the project to deliver a much higher priority value (over 37) and secondly, the planned interference with the stakeholders is much more intensive. All the identified stakeholders are involved apart from the external stakeholder: the financing institution (FI).

In the analysis of the first sprint, which would have taken place at the end of the 2. month, when the project team would have had to meet and share all the positive and negative remarks about the sprint, it is certain that the little enthusiastic behavior of some of the stakeholders would have been noticed. The tasks planned for the 1. sprint cover those of getting the necessary data (especially task 2.3), conducting questionnaires (task 3.3) and even selecting University X areas for the trial system implementation. It is now clear that those task would not have succeeded. Already at the end of the 2. month the project team would have had the information that the project implementation was going to be far from smooth. In the traditional approach, thus in reality, this message at this moment was not even suspected.

If the agile approach would have been applied, already after the 2. month of the project the project scope would have been changed or even the decision of project break up would have been taken. And if the project had not been so difficult, the stakeholders would have obtained already in the first two months of the project a high value (over 37), they would have been asked, made involved, they would have had the possibility to influence the shape of the final system and, as a result, they would probably be satisfied with the project outcome.



Conclusion

In the paper a real world R&D project was analysed, a project which was not quite successful. It is shown that its failure could have been minimised if the agile approach to project scheduling had been applied. This approach forces the project manager to reflect in the scheduling process on how to deliver the highest possible value and satisfaction to key stakeholders in the earliest possible moment and to systematically analyse the attitudes and opinions of the stakeholders. Thanks to this either the stakeholders get more involved in the project and their satisfaction is high (which is an important dimension of project success) or their negative attitudes are revealed early and the necessary steps can be taken.

Of course, the agile approach has some disadvantages. The main one is its complexity. It is highly time and effort consuming to analyse all the stakeholders and their needs before the project start and it is not always completely possible. Also, the agile approach does not deliver a detailed plan for the whole project implementation period. Thus, it is impossible to elaborate detailed plans for the organisations implementing the projects and for the institutions financing them. On the other hand, the nature of many R&D projects makes it impossible to make long term detailed plans and the agile approach corresponds to this nature.

Of course, more case studies and theoretical contributions are needed in order to elaborate a systematic agile procedure for R&D projects scheduling and generally planning.

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Novice Programming Experience Using Scratch: Is There Gender Difference?

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Abstract

This study was done in the effort to examine the effect of programming for 110 grade three (8-9 years) students during the information and communication technology (ICT) session. This study is quantitative action research aiming to define whether there is a difference in genders' performance in programming and the best time to teach it during the day. Results shows that the boy and the girls has relatively near results however, girls had slightly higher average. The timing of the day was critical; students at the beginning and at the end of the day had somewhat less time to experiment with the project and needed extra time to finish their task. Enthusiasm was shown clearly in the survey where a high percentage of the students wanted to create more games in future using scratch.

Keywords: Educational Technology, ICT Education, computational thinking, primary school **Main Conference Topic:** Computer Science, Global Issues In Education and Research, Educational Technology.

Introduction

We are living in a time that technology is moving in rapid pace, all sectors are affected by the fast pace of technology. Education on the other hand is the slowest to pick up with the fast pace of technology (Abou Afach & Kibbi, 2016). With this rapid pace, computer function and definition has changed; they are not considered as a tool according to John Maeda, it is material for expression (Maeda, 1999; Koehler & Mishra, 2009).

Computer science is a major that every student should be introduced to, movements are making efforts to reach for all students. The hour of code, is an annual event where students get introduced to computer science through their favorite cartoon or games (Hour of Code , 2016). According to the president of united state Obama in his speech in 2010, he considered those who doesn't know how to code are illiterate (CCGA, 2016).

According to International Society Technology in Education (ISTE, 2016) standards for students is divided into six different categories. These categories are the following; 1) Empowered learners, b) Digital citizen, 2) Knowledge constructor, 3) Innovative designer, 4) Computational thinkers, 5) Creative communicators, 6) Global collaborator. These skills should be introduced, reinforced and mastered by 21st century generation to strive in their lives before leaving the school (ISTE, 2016). Thus, the responsibility falls on all teachers lap to ensure students skills. While ACMS for computer science, augment the ISTE categories and focused on algorithm thinking and other computer skills specially in k-8. This algorithm foundation for students allow them understands the "if" and the "loop" condition. These skills allow them to be better computer experience (Mei-Chuen Lin, Yen, Yang, & Chen, nd; Papert, 1980). Programming is a language that allow students to have skills needed for their future (CSTA, 2016).



The need for primary students to learn programming has exceeded the programming benefits to reach an important aspect for students which is creativity. Students while learning how to program learn how to imagine and how to use and develop their creativity skills. Thus programming is becoming a self-expression tool (Peppler & Kafai, ND).

This study aims to study introduce programming to grade three students (8-9 years) to study the effect of it on students thinking skills. Many applications are available out there for primary students however scratched was picked for this study because of the following reasons: The interface of Scratch is user-friendly, as well as the sprite. The Blocks that makes programming is easy for students to try without going through debugging. Students can directly drag and drop the block experiment and try the outcome on the other side of the screen that allow students to critically think what is working and what is not (AEP, 2004). Moreover, scratch allow students not only to draw but also to import an image. Students by the end of the project can export their work with a large community of users, get feedback or help others when they download it or change parts of it to suit their aim (Maloney, Resnick, Rusk, Silverman, & Eastmond, 2010; Guzdial, 2003; Resnick, 2004; Resnick, Kafai, & Maeda, 2003; Peppler & Kafai, 2005). For this, scratch was chosen as the platform to introduce this new language for students. Scratch application allow students to creatively create their character using their artistic side, modify and program it to complete a purpose (Prensky, 2008; Zaharija, Mladenovic, & Boljat, 2013). Through scratch students will be applying the constructivism theory where they learn by doing. Students tend to see how math and science is applied in our daily life and how students can use these acquired knowledges in a computer based "imaginative" project (Peppler & Kafai, ND). Although some are teaching it through extra-curricular (Çinar, Pirasa, Uzun, & Erenler, 2016), but extracurricular activities tackle the interested students and those who are aware about the computer science effects and benefits on students computational thinking. There is no or little documentation of computer science integration in k-12 and specifically in k-5.

Problematic situation

Students spend around seven sessions per day in their classroom. The teaching strategies used in the classroom can be considered as traditional; students depend on memorizing facts. They are trained on the questions ahead of the exams time. They are not conformable analyzing or being creative; they prefer to have something to copy from. Their English language (second language) is limited, they are conformable reading and communicating with their mother language while all the technological devices are in English language. Teachers teaching third graders complain about the students' attitude in the classes. The classes are not equipped with technology, there is no electronic device in the classroom nor an active board. The only time the students see a computer and work with it is when they are having their Information and communication Technology (ICT) session. Students take one ICT session per week. Thus to make sure the students are getting the skills for tomorrow, the ICT teacher is responsible to introduce the skills in the class. To solve the problem stated above, scratch was found to be suitable for students for the below reasons:

- Students will experiment with programming user-friendly environment.
- This program is designed by MIT, and was experimented on students for several years so far.
- Students need to have minimal computer skills (Drag and Drop).
- They will be introduced to programming through authentic environment while they are engaged to it.

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Research question

The aim of this research is to solve the stated problems and expose students to skills for the first time in their life. The following questions are the question guided this research.

1- What factors are behind the problem disparate gender representation in computer science in general and programming in specific?

2- Does the timing of the day affect the students' computer science performance on different concept?

3- What are students' perception towards scratch?

Methods

This study is a quantitative action research aims to define whether there is a difference in genders' performance in programming and the best time to teach it during the day. The participant of this study were picked in a non-random way; it is a convenient sample, where students are the researcher students and scratch was picked as part of a new change to be introduced to the students' curriculum based on the teacher recommendation. The students come from a low income social status. It is located in the capital of Lebanon, Beirut. The students under study are third graders (8 – 9 years old). Students had no computer access during the school day or after school. If they have computer at home, their parents wont allow them to use it because the computer is still considered for play time.

Scratch was picked to introduce programming for students because it is well designed, have user-friendly interface and students can develop their skills on their own due to the help button and finally because scratch has online community for the students to ask and post their work. Five sessions was dedicated for scratch; a session to introduce the programme and define the different section and the other 4 sessions was for two project. The first project was a guided project and the other one was an open-ended project.

The first project: Students have to create a maze game. The maze game was divided into three parts, Designing the game, programming it and fine-tuning and finally the gaming time. The teacher introduced the skills needed for the students to be able to design the game, she also explained that each sprite should be drawn separately. After showing a mock of their task, students have to team up with their partner to draw the ball, maze, beginning and the finish line. Some students were able to draw each of the parts separately while others needed some guidance. In two sections the students had to send the images because students couldn't finish within the first session all the objects needed to programme them. One of the section is at the end of the school day; usually the class session (B) is 55 min, Students spend 7-10 minutes lining up and getting from and to the computer lab, however the last session is only 45 min since they have to wrap up and leave home. The other section (C) is at the beginning of the school day, where attendance and getting from the playground and have our morning meeting.

During the second session, students were able to understand how to programme the objects and that each object should be programmed alone. Students had the time to programme it. The programming took much more than the teacher expected as they had to try and change some of the codes in their try and error process. Some students wanted to give up after the first time, while others used each other help while using their inside voices.

Part of the third session was dedicated to the programming as well. Very few students were able to finish from the second session, they had the third session as play with the game

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they designed or discover some parts of scratch. These few students volunteered to help their students. At the end of the third session the teacher surveyed the students of what they prefer to make (another game or a story) the majority of the students wanted to create a story.

The second project: After showing the features that most probably the students will use, the teacher told the students that they can pick their partner and sit on a computer of their choice and start with the story. The guideline of the story was the following.

- A background,
- Characters,
- Talking/moving character
- A plot.

Students enjoyed the fact that they are teaming with a partner of their choice and started designing the story. The teacher passed by the students to answer questions. Some of the questions where if they can do something that was not explained and the teacher helped them with it. The students were asked to save the story to continue it in our next session. Students in the second session of the second project were asked to continue the story. Creative scenes and creative thinking was the first impression of what the stories behind. The students were gladly working together to finish the task, as they were enthusiastic to do so, they were practicing experimenting by doing. All sections had the two sessions time to finish their task, the section at the end of the day (B), needed more time however due to time constrains the teacher was not able to do so.

Discussion

This study is a qualitative action research aims to discover the effect of programming to novice students. The program picked for this study is Scratch by MIT. The program features are easy for the novice students to understand and experiment with. The total frequency of the sample is 110 students. The difference between the boys and the girls is not big; the females over number the male students by 2; 56 are females and 54 are males. Results of conducted experiment are given in Table 1.

	Frequency
male	54
female	56
Total	110

Table 20: Gender Frequency

Out of the 110 students, 25.5% of the students are considered to have behavioral issues. These students are divided in the four section of the study. 28 students have behavioral issues, an average of 7 students per class. This number of issues per class is big specially that the average number of students per class is 29. Results of conducted experiment are given in Table 2.

		Frequency	Percent
Valid	good	82	74.5
	issue	28	25.5
	Total	110	100.0

Table 2: Students Behavior



As for the ICT class, the lab is in the last floor in the building, students will have to go up to computer lab with the teachers. There are 19 devices; most of the time all are working but sometimes a computer or two dies and will take time to get fixed. Students in the ICT session share devices, the teacher is the only person in charge explain, to answer questions, fix problems, in case students need help they need to wait until the teacher is free to help.

As for the assessment and grading for the first project, the first project grade was divided into two parts, one part was on the script and the other part on the drawings. The minimum grade is 3 out of five on each strand. The maximum grade is 5; those who completed the task as was suggested. 60% of the students took the minimum grade (3/5) while 28% took (5/5). On the second strand; the script, the grades were diverted. 38.2% of the students took the minimum grade (3/5), 12.7% (3.5/5), 17.3% tool (4/5) and 28.2% took (5/5). The highest percentage was to the minimum grade followed by the maximum grade. Results of conducted experiment are given in Table 3

Draw		Frequency	Percent	Script	Frequency	Percent
	3.0	66	60		42	38.2
	3.5	3	2.7		14	12.7
	4.0	9	8.2		19	17.3
	4.5	1	.9		4	3.6
	5.0	31	28.2		31	28.2
	Total	110	100.0		110	100.0

Table 3: Drawing and script grades

While the grades in the second project was more diverted than the first project. The grade was summed up according to the story criteria. The highest grade was for the (3/5) grade, 36.4% (40 students) while the second highest percent was to (3.5/5) 32.7% followed by 11.8% (13 students). The mean of the grades boys scored below that of the female gradefor the drawing part. While the case is the opposite with respect to the programming part. Boys scored more that the girls. Results of conducted experiment are given in Table 4 and 5.

Table 4: Grades divided by gender

	gender	Ν	Mean Grade
draw	male	54	53.08
	female	56	57.83
	Total	110	
script	male	54	54.04
	female	56	57.01
	Total	110	

Table 5: Project 2 grade

		Frequency	Percent
	3.00	40	36.4
	3.25	4	3.6
	3.50	36	32.7
	3.75	6	5.5
	4.00	6	5.5
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4.25	1	.9
4.50	13	11.8
4.75	2	1.8
5.00	2	1.8
Total	110	100.0

When students had the chance to pick their partner in the second project, 81.8% of the students teamed up with the same gender unlike their usual setting in the lab where they are teamed up by different gender. Only 10% of the students decided to pick a different gender, while 8.2% preferred to work on their own and create their own solo story. Results of conducted experiment are given in Table 6.

	Frequency	Percent
alone	9	8.2
Same	90	81.8
different	11	10.0
Total	110	100.0

The timing of the day affected the students' programming and ICT performance. Students in section (B) and (C) did not have the time to play with the game they designed in the first project while in the second project they needed more time to finish their whole story.

There is a difference between girls and boys programming results, however the difference is not that high. The boys and the girls when they were given the chance to pick their partners they prefer a same gender partner and grades average was higher than that of mixed gender per group. Although the grades were not high, but students showed interest and enthusiasm in the software. The class management during the five scratch sessions was bearable, the teacher didn't ask anyone to have a timeout or do any extra measure. Students were into what they are doing and were engaged with their friends to finish the task. Finally, students during the first and the last session had relatively less time to experiment with the software as they came after 10 minute the computer lab (in case of early morning session) or had to leave early for dismissal (in case of the end of the day session).

Conclusion

This study is quantitative action research was done on grade three students on four different sections. The sum of the student's understudy was 110. The students are from a low income financial background and they have little knowledge and computer use. They consider that computer is just wasting time. None of the students have previous programming experience. The aim of this study is to define whether there is a difference in genders' performance in programming and the best time to teach it during the day. Students spend time on this project, the first project was introduction to the programming and the last project was open-ended project where they had to create a story from things they learn and from things they discovered. They were allowed to ask the teacher and to get help from their friends. Results shows that the boy and the girls had relatively near grades; girls average was higher than that of the boys. The timing of the day was critical; sessions at the beginning and at the end of the day are comparatively less than that during the day, students needed more time during these sessions to finish what their friends in the other section had to experiment with the project. Although the students enjoyed the program to a great extent yet their grades were



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not relatively high, programming is a demanding language that most of the people find it challenging. Although students' grades were not high, yet their enthusiasm was shown clearly in the survey where a high percentage of the students wanted to create more games in future using scratch. Student x (male) downloaded scratch on him computer at home after the first week of introducing scratch while student y (male) used help to learn more at class after finishing the task.

The limitation of this study was time; students only spent 5 sessions on scratch. They were excited to learn more about it yet due to curriculum demand the teacher has to move to another topic. The other limitation is that students shared the device through both project. In that way the evaluation on both project was based on the team. Both member of the team sitting on the same device took the same grade as it was impossible for the teacher to know who did what. It is recommended to study the effect of programming while students are working individually on a computer. Moreover, it is important to study the programming effect on students in different grade level and compare them with this study.

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The Performing Arts: A Vital Link between Education and Research in Secondary Schools

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It is well documented that the arts play a pivotal role in the academic development of students especially at secondary school level. Over the past seven years, the South African Music Outreach Project (SAMOP) has established instrumental music programs at disadvantaged high schools across South Africa. The purpose of the project is to impact education through the performing arts for disadvantaged school students. Several longitudinal studies have been conducted to determine the impact of the performing arts on certain educational, social and psychological variables such as academic achievement, academic perseverance, motivation, self-esteem and a host of additional variables on the students within the project. This presentation will focus on the process upon which the music programs are integrated into the overall academic program and the results of some of the recent studies conducted on students. The presentation will provide a model for integrating research into education and research and the possibilities for how the two concepts can be integrated. Data from one of the most recent studies will be presented to demonstrate the impact that the arts have on the general education of students.

Keywords: Education, research, secondary school, performing arts. Conference Topic: Links between education and research



Multidimensional Factors Predicting Academic Achievement

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Abstract

Achievement is the ultimate goal of any academic program and the focal point of research in the field. Although it is defined and analyzed in many ways, achievement is frequently associated with GPA or the grades received from large-scale exams or the ones conducted in different school contexts. As achievement is a multifaceted term, numerous factors predicting the success levels of students should be taken into consideration before making vital decisions. Therefore, the aim of this presentation is to give a brief overview of these factors that affect the academic achievement of students. The presentation will give insights about the student-related, school-related, teacher-related and familial causes of success or failure. Under the student-related factors, cognitive, emotional and physiological causes will be discussed. School-related factors will focus on the school effectiveness term. Teacher-related factors will be analyzed in the light of teacher qualities. Finally, familial factors such as socio-economic aspect and parental attitudes and expectations will be mentioned. These discussions are expected to create an awareness about the achievement term and the way we evaluate our goals in our education programs to boost achievement.

Keywords: academic achievement, socio-economic status, parental attitudes, causes of failure

Main Conference Topic: Educational Sciences



Effect of Micro Teaching Practices with Concrete Models on Pre-service Mathematics Teachers' Self- Efficacy Beliefs about Using Concrete Models^{*}

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Abstract

Using concrete models in lessons facilitates the teachers' work, but teachers need to have sufficient knowledge and skills in order to use instructional materials in their lessons efficiently. However, it is not easy for many teacher and pre-service teachers with limited experience in this area, to acquire the ability to choose appropriate materials and use them effectively (Özdemir 2008). It is thought that micro-teaching technique will be an effective method to gain these skills to pre-service teachers. In this context, as a result of the micro-teaching technique with concrete models, it is thought that self-efficacy beliefs and skills about concrete models will be changed. In this way, it will be possible to apply both the theoretical knowledge of the pre-service teachers and to try to determine whether teacher qualifications which should be given to the teacher candidates are gained or not by reviewing the lectures in the classroom environment. When the literature was examined, there were limited researches that investigate the effect of micro teaching practices on self-efficacy beliefs about concrete models. Therefore, it is considered that the researcher will fill the void in the literature.

The aim of the research was to investigate the effects of micro-teaching practices with concrete models on pre-service mathematics teachers' self-efficacy beliefs about using concrete models. Research was conducted on 44 pre-service mathematics teachers who enrolled teacher education program at faculty of education. The Instrument of Pre-service Mathematics Teachers' Efficacy Beliefs about Using Manipulatives (EBMU) developed by Bakkaloğlu (2007) and semi-structured interviews were used as data collection tools. Preservice mathematics teachers were enrolled to four week training program about concrete models. EBMU was used as pretest and posttest to pre-service teachers. At the end of the training program, micro-teaching practices with concrete models were applied for ten weeks. After micro-teaching practices, independent sample t-test were used to analyze quantitative data and content analysis method was used to analyze the data obtained from the pre-service teachers' interviews. According to the results micro teaching practices have positive effect on pre-service mathematics teachers' self-efficacy beliefs about using concrete models. Opinions of the pre-service teachers also indicated that, the micro teaching practices with concrete models had positive affects to their self-efficacy beliefs about using concrete models. Preservice teachers also stressed that micro teaching practices effected to improve their teaching, using concrete models and class management skills positively.

Keywords: concrete models, micro-teaching, self-efficacy beliefs, pre-service mathematics teachers

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Investigation of Teacher Candidates' Attitudes Towards Values Education in the Context of Individualism -Collectivism Values

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Abstract

This study is a quantitative study in the relational survey model aimed at determining the relation between the individualist or collectivist values of the prospective teachers and their attitudes towards the teaching of values. The student's universe is composed of students who are taking formation course at Bingöl University, Turkey. Sampling was taken considering the number of teacher candidates. Sampling consists of 350 teacher candidates. "Individualism - Communityism Scale" as a data collection tool for determine Individualist - Collectivist values and "Values Education Attitude Scale" was conducted to determine preservice teachers' opinions about values education. Since the collection of data has not yet been completed, no data analysis has been performed. However, once the analysis of the data, normality tests have been applied, appropriate correlation tests will be applied and the results will be reached in the context of the study problem.

Keywords: values orientation, individualism, collectivism, values education,

Main Conference Topic: Academic Conference on Education, Teaching and E-learning

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Mobile Learning perceptions of Formal and Distance EFL Teacher Candidates

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Abstract

The purpose of this study is to find out Turkish pre-service EFL teachers' mobile learning perceptions in formal and distance education. To this end, a total of 526 teacher candidates completed the 'Mobile Learning Perception Scale (MLPS)'. 310 of the participants were teacher trainees at Anadolu University Faculty of Education ELT program as the participants from the formal education. The remaining 216 were the distance education participants who were studying at Anadolu University Open Education Faculty Distance ELT program. The present study, first of all, found out that Turkish pre-service EFL teachers' mobile learning perceptions were quite high. Second, certain differences were significant among the preservice teachers. Females had significantly higher perceptions about mobile learning applications than their male peers and 4th year students' mobile learning perceptions. Finally, pre-service EFL teachers in both distance and formal education had high levels of mobile learning perceptions without any significant differences.

Keywords: mobile learning, perceptions, distance education, EFL teacher education **Main Conference Topic:** Research on Technology in Education, Teacher Education, Distance Education



Preservice Science Teachers' Understanding of Turkish Science Education Instructional Program

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Abstract

The recent Turkish science education instructional program promotes inquiry-based instruction as the main instructional approach [1]. However, studies indicate that science teachers have limited experiences with and understanding towards inquiry [2]. Therefore, researchers advocate for improving science teachers' college experiences towards planning, critiquing and revising inquiry lesson plans [3]. However, little is known about planning, critiquing and revising inquiry lesson plans on preservice teachers' understanding of curriculum reform. Therefore, the purpose of this study was to investigate preservice science teachers' understanding of curriculum reform. This study employ a single instrumental case study design [4]. The participants were 49 preservice science teachers enrolled in science and technology program and planning course in a public university in northeast Turkey. Data was collected through `understanding of curriculum reform` questionnaire containing six open ended questions. Data was analyzed using inductive open coding [5]. Question included vision, main instructional approach, assessment, teachers' and students' roles, scientific process skills and socioscientific issues dimensions of the instructional program. Results indicated that preservice science teachers had limited understandings towards scientific literacy, assessment, scientific process skills, and socioscientific issues. After engaging in planning, critiquing and revising inquiry lesson plan activities, preservice science teachers increased their understanding towards scientific process skills and scientific literacy. However, they had limited understanding towards assessment and socioscientific issues in a way promoted in the reform document. Therefore, the implications include explicit teaching of socioscientific issues and enhancing preservice science teachers experiences towards alternative assessment techniques. This study is funded by Recep Tayyip Erdogan University, Office of Scientific Research Projects, no 2015.53001.105.01.10

Keywords: science education, preservice science teachers, instructional program **Main Conference Topic:** Science Education

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Science Teachers' Views about Using Technology in Argumentation

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Abstract

Argumentation is one of the fundamental practices of science and has been a well-established research area in science education [1]. However, little is known about teachers' practices in science classrooms regarding technology use in argumentation. The purpose of this study was to investigate Turkish middle school science teachers' views about using technology in argumentation. The participants were 25 (13 female, 12 male) middle school science teachers working across Turkey. The participants were enrolled in an eight-day workshop on argumentation. The workshop included technology enhanced argumentation applications. Teachers were asked to create argumentation-based lesson plans and implement it in their classroom within three weeks after completion of the workshop. We used sequential mixed methods research design to better understand teachers' experiences towards technology use during argumentation [2]. We conducted an hour-long focus group interviews and gave an online questionnaire to the teachers. We employed inductive open coding to analyze data [3]. Results indicated that using technology in argumentation has many advantages such as increasing motivation, having fun, supporting permanent learning and supporting argumentation with multiple external representations. On the other hand, the teachers mentioned some of disadvantages of using technology in argumentation: infrastructure, timing, preparation; classroom management, and extra costs. The teachers also stressed that their students had high motivation while having hands-on argumentation activities. However, the lack of technology knowledge, expenses and procrastination caused some challenges. Overall, science teachers in this study had positive views about using technology in argumentation. It was also noticed that science teachers in this study created an online learning/support community to interact with other science teachers by sharing their experiences.

Keywords: argumentation, technology, science teachers **Main Conference Topic:** Science Education

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Science Teachers Learning to Teach through Creative Drama: An Evaluation of a Project*

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Abstract

Drama in education may also help individuals in developing their communication and decision making skills as well as ensuring that individuals gain sensitivity towards their peers [1]. Creative drama can be used as a method in the courses. 'The teacher following this method collects the best reference materials, literature, and artifacts he/she can find. The children are encouraged to spend sufficient time studying them in order to build an original drama' [2]. The purpose of this study was to identify science teachers' views of creative drama. Within this purpose, science teachers enrolled in a four-day interactive workshop on creative drama to learn about how to teach science through creative drama. Research indicate that teachers pose positive views on the effectiveness of creative drama, the importance of getting educated on creative drama and the effect of drama education on their views are important. In this case study, the participants were five science teachers working in public middle schools. The participants received training on 24 hour-long creative drama education completed in four days. Teachers created creative drama-rich lesson plans. Participating teachers implemented these lesson plans in their classrooms. Prior and after implementation of the lesson plans, the participants' views about the implementation were identified using questionnaires with open ended questions. Data was analyzed using content analysis. To ensure validity, data was analyzed by two researchers and codes were discussed until the final agreement was reached. The findings indicated that the teachers had positive views towards implementing drama in science classrooms. As an implication, we suggest engaging science teachers in drama workshops to increase their understanding how to implement it in science classroom.

*This study was supported by Recep Tayyip Erdogan University, Office of Scientific Research Projects, Project number 2015.53001.105.01.13, Teachers are Learning to Teach through Creative Drama project.

Keywords: science teacher, creative drama, project **Main Conference Topic:** Primary Education

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Painters in the Eyes of Children: A Painter Images Study

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Abstract

Art is necessary for an individual to know and change the world. However, it is necessary just because of the spell it has in its spirit [1]. Art is simply related to the concepts of "plastics" or "visual"; however, it also involves the concepts of literature and music [2]. The artist is the person who is involved in productive activity in one of the arts and performs humane creation [3]. There are several variables effecting children's images of painters. Among many, one variable is art education courses offered in primary education. Therefore, the purpose of this study is to investigate 4th grade students' images of painters. This study was conducted in 2016-2017 school year with 40 volunteer 4th grade students studying in Rize, Turkey. A form composed of two section developed by the author was used as a data collection tool. In the first section of the questionnaire children were asked to draw a painter. In the second section, several questions were asked about the children's drawings. The form was evaluated by another expert researchers and final version of it were used to collect data. 'Qualitative data analysis involves organizing and reducing of information' [4]. Content analysis was used during data analysis. To support the findings of the content analysis, the students' direct quotations were used. Findings were discussed in terms of the place of art education in primary schools. Implications included directing students to make conscious choices in terms of the media followed to shape children's image in a more effective way.

Keywords: art education, artists, painter, painter images **Main Conference Topic:** Primary Education

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Beyond the Walls: Integrating Instagram into EFL classes

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Abstract

With the advent of technology, computers, İpads and mobile phones have gained popularity in most of the areas including foreign language education to meet the needs of the new era. Thus, the integration of technological devices to teaching environment has become prevalent. Among the technological devices aforementioned, mobile phones are increasingly popular in that most students prefer using mobiles to keep pace with the world via social networking sites such as twitter, facebook, or instagram. Launched in 2010, instagram is widely used by a great many people including university students. This study designed to offer various out of class language activities that require a 4-week active participation on a voluntary basis aims to gather information on the perceptions of upper- intermediate level EFL students at School of Foreign Languages, Anadolu University. The data will be collected via a likert type questionnaire and focused interviews with a sample of the participants in the study.

Key Words: Instagram, MALL, Integration of Technology in ELT, EFL

Main Conference Topic: Language education



Adjustment Problems Experienced by Turkish Students Studying in a Dual Diploma ELT Program in the U.S.A.

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Abstract

The purpose of this study is to investigate adjustment problems experienced by 43 Turkish dual diploma students studying in an ELT (English Language Teaching) program established between a Turkish and an American university. The data of the study were collected through a 35-item questionnaire designed by the researcher. Besides from providing an overall score which indicates the level of adjustment problems experienced by the students, the questionnaire also gives information about the types of problems with its four subscales: academic culture/education, English, orientation/preparedness, and personal/social/global. The data of the study were analyzed by using descriptive statistics, correlation coefficients and multiple regression analysis. The results of the study indicated that the participants of the study experience moderate level of adjustment problems, and academic culture differences and English proficiency are the most important factors affecting their adjustment process. Suggestions for current and future dual diploma program designers, administrators, professors, and students are discussed in the light of the findings of the study.

Keywords: international education, dual diploma program, adjustment, English proficiency **Main Conference Topic:** Education, International Education



AC-ETeL 2017

Relative Importance of Psychological Flexibility as a Strength Indicator on Wellbeing Levels of Undergraduates

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Abstract

Wellbeing is a multifaceted phenomenon; and developing an understanding of its determinants is a crucial goal for psychological and educational research. The current study aimed to compare the predictive roles of three indicators of vulnerability, namely, fear of negative evaluation (FNE), psychological vulnerability (PV) and psychological (in)flexibility (PI) on the wellbeing subdomains of emotional, psychological and social wellbeing (within the Mental Health Continuum framework) on an undergraduate sample. The study group consisted of 382 undergraduate students (178 males, 204 females) studying in a state university. Zero-order correlations indicated that all the three indicators of FNE, PV and PI scores had significant correlations with emotional and psychological wellbeing scores and not with social wellbeing scores. Two stepwise regression procedures regressing FNE, PV and PI scores on emotional wellbeing and psychological wellbeing revealed that PI scores had the highest predictive power and coefficients for PV became insignificant in both occasions; and FNE coefficients became insignificant for emotional wellbeing and not for psychological wellbeing. Findings indicated that PI can be viewed as an important vulnerability indicator accounting for the variance of the two latter indicators. The results supports the importance and promise of psychological (in)flexibility as an important vulnerability/strength area for future studies.

Keywords: Fear of negative evaluation, Psychological vulnerability, Psychological flexibility, Wellbeing, Stepwise regression

Examination of Pre-Service Science Teachers' Sustainable Consumption Behaviors to Provide Low Carbon Life Style

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Abstract

Although the world is quite large, all parts of it have been used today. Recent studies show that biocapacity of our world doesn't meet the demand of our needs since the beginning of the 70s (Living Planet Report, 2014). Especially, considering carbon assimilating capacity which is under the land use categories for calculating an ecological footprint (Wackernagel & Rees, 1996), humanity's demand has reached 1.5 times of planet's biocapacity recently (Living Planet Report, 2014). Such problems about the increase in the amount of carbon emitted into the atmosphere which cause climate change in the world depend on human behaviors (Nordlund & Garvill 2002; Oskamp 2000). Changes in human behaviors including pro-environmental behaviors depend on their awareness and self-management of human beings' behaviors (Jones & Kammen, 2011; Lin, S-M, 2015). In daily life there are many places where behavior such as social life, school, work occurs. Education has a major place in the development of pro-environmental behaviors throughout people's lives. This study aims to determine the sustainable consumption behaviors within the scope of low carbon behaviors with pre-service science teachers in Turkey. Measurement was done with a quantitative scale rating from 1 to 5. The result of this study showed that level of sustainable consumption behaviors is acceptable. Mean value of sustainable consumption behavior is 4.50. For future studies, researchers can search factors affecting sustainable consumption behavior with behavioral theories such as theory of planned behavior and value belief norm theory.

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Key words: Pre-service Teachers, Sustainable Consumption Behaviors, Carbon Footprints **Main Conference Topic:** Science Education, Education for Sustainable Development

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Examination of Factors Affecting Food Consumption Behaviors of Individuals Who Live in University Community in the Scope of Theory of Planned Behavior

AC-ETeL 2017

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Abstract

The recurrence of obesity, especially at lower ages, triggered by health problems in all age groups, has been shown to increase health problems that may arise later (WORLD HEALTH ORGANIZATION [WHO], 2012). Therefore, it is very important to reveal the factors that can affect nutritional behavior. One of the widely used models to study the effects of these factors on human behavior is the Theory of Planned Behavior (Ajzen, 1991). A scale called "prediction of health-related behaviors" which is 5 point likert type consisting of 86 items developed by Sparks and Guthrie (1998) and McEachan, Conner, Taylor and Lawton (2011) to determine the factors affecting individual food consumption behaviors was used. The data to be used in the research were collected within one month in spring semester of 2016-2017 academic year. Prior to the implementation of the data collection tools, all participants were given and signed a consent form confirming their voluntary participation in this work. Fundings of the study showed that the most factor affecting food consumption behaviors of individuals who live in university community is attitude. Results of the study will guide to new studies which improve food consumption behavior.

Key words: Food consumption behaviors, University, theory of planned behavior **Main Conference Topic:** Science Education, Education for Sustainable Development, Food Consumption

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Preschool Teachers' Language Activities for Bilingual Children

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Abstract

Turkey is linguistically diverse, with Kurdish, Laz, Zazaki, Arabic and Syriac each being spoken as the main or only language of large numbers of citizens. The percentage of Kurdish children who arrive at preschool not knowing Turkish is relatively high, yet they are expected to communicate in that language right from the start. By the same token, preschool teachers are expected to communicate with children in Turkish effectively and to form a bridge for children's linguistic and cultural characteristics. Therefore, it is important to understand how (or indeed if) preschool teachers plan and conduct Turkish-language activities that cover the needs of all the children in their classrooms. In Turkey's preschool education curriculum, it is stated that Turkish activities are aimed at helping children speak Turkish correctly and fluently, increasing their vocabulary, and improving their communication skills. As such, it recommends a range of activities that include oral presentation of nursery rhymes, presentation of finger-puppet plays, asking riddles, informal chatting, reading picture books, role playing and storytelling. However, if such activities are to achieve these goals, it is important to consider the needs of bilingual children from the planning stage onward. Therefore, this study analyzes 22 Turkish preschool teachers' experiences of bilingual children in their classrooms in Van, a majority-Kurdish province located on Turkey's border with Iran. Specifically, data on how these teachers planned and conducted activities for bilingual children was collected through a semi-structured interview protocol developed by the researchers, and analyzed via the word-list technique. Preliminary results of analysis indicate that the participants made some changes to their activities, with emphasizing that they considered children's individual differences (including home language) when planning. The findings will be discussed at the Education, Teaching and E-Learning Conference (AC-ETeL 2017) in Prague.

Keywords: language activities, bilingual children, preschool teachers, Turkey **Main Conference Topic:** Education, Teaching and E-learning

Multidisciplinary Academic Conference

Needs Analysis Survey for Research in Language Teacher Education

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Abstract

Effort into research about how language teachers should be prepared, educated and trained is well-spent. As part of an Erasmus + project called ILTERG (International Language Teacher Education Research Group) co-funded by Turkish National Agency and Erasmus +Proram, this study aims to present the findings of a needs analysis survey in the field of language teacher education. The survey has been implemented to participants from different countries. The participants are academics as expert researchers and MA and PhD students in language teacher education as novice researchers. The survey has been responded by 139 participants from different countries (Turkish: 70, Polish: 32, Portugese: 24 and Others: 13). The findings of the survey has revealed a comprehensive list of research topics perceived to be important in language teacher education research. Moreover, Interviews with 16 researchers (4 professors, 6 Associate Professors and 3 Assisstant professors, 3 PhD holders) has provided a deeper insight into which research topics are prominent and why. Both the qualitative and quantitative data from the survey and interviews will be discussed with suggestions for line of research to contribute language teacher education.

Keywords: language teacher education, research in language teacher education, needs analysis

Main Conference Topic: Language Education

AN EVALUATION OF MAP LITERACY OF SOCIAL STUDIES PRESERVICE TEACHERS

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Abstract

The purpose of this study was to determine the level of map literacy of pre-service social studies teachers. The research was carried out using the relational survey model. The data collection tool used in the research was the map literacy scale titled "Developing Valid and Reliable Map Literacy Scale" developed by Koç and Demir (2014). The research was conducted on 221 pre-service teachers majoring at Gazi University, Faculty of Social Sciences Education Department in 2015-2016 academic year. Multiple linear regression analysis technique was applied in solving the sub problems of the research.

According to the findings obtained from the research; when the correlations between the predictive variables and the dependent variable were examined, a positive and moderate correlation was seen between the level of map literacy of social studies pre-service teachers and variables such as competence in map calcuating, map reading, draft map drawing and map use.

When the partial correlations between the predictive variables and the dependent variable were examined, it was determined that the social studies pre-service teachers had a positive and moderate relationship between map literacy levels and map reading and interpretation competence variables. On the other hand, it was determined that social studies pre-service teachers had a positive and weak relationship between map literacy levels and draft map drawing and map use competency variables.

In addition, social studies pre-service teachers have a moderate and meaningful relationship with their map literacy level together with map calculating, map reading and interpreting, draft map drawing and map use variables.

According to the results of the research, it is seen that the competences that social studies pre-service teachers perform with the maps are a moderate predictor of map literacy. For this reason, it is suggested that emphasis should be given to the courses and practices that will develop the map skills in the social studies undergraduate programs.

Keywords: map literacy, map processing, map reading and interpretation, map drawing, map use, social studies pre-service teachers

Main Conference Topic: Higher Education

Multidisciplinary Academic Conference

Academic Conference on Transport, Tourism and Sport Science AC-TTSS 2017

Transport

<u>Tourism</u>

Sport Science

Logistics



Technical and économic impacts on different methods of improving the performance of a gas pipeline.

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Abstract

Today, natural gas represents 24.7% of the global energy consumption. Over 106,000 m^3 of natural gas are consumed every second in the world, (3,350 billion m^3 of gas per year). World production of natural gas in 2012 amounted to 3 193 billion cubic meters.

In a context of growing concern of degradation of the environment, first quality natural gas is its non-polluting nature. For this we propose in this article to improve technical performance gas pipelines existing or future, to today, in order to obtain better performance, lower transportation costs, as well as flexibility of use compared to the competing energies. The Algerian exploitation policy, through the Transport activity of SONATRACH, which manages 16,200 km of pipelines, is to maximize revenues by optimizing the recovery and the means of transport by pipelines.

There are several methods of improving the performance of a gas pipeline to know:

(1) increase in the diameter of the pipe, 2) increase of the discharge pressure; (3) doubling of compressor stations; (4) cooling of the gas at the beginning of sections; (5) improvement of the strength characteristics of metal component pipeline; (6) decrease roughness of the pipe; (7) monitoring of the integrity of the pipeline; (8) improving the capacity by parallel conduct (looping); (9) treatment of gas initially; (10) Finally it can combine all of these methods together.

Each of these methods has its advantages and disadvantages as feasibility (construction difficulties) and costs generated by the application of the method.

We can enumerate the following cases: the increase in the diameter of the pipeline, whatever limited to 48" or same 56", will greatly reduce the load losses and the number of compressor stations, but will require greater discharge pressures which will increase the temperature of the gas. The latter will not have time to dissipate between stations and therefore will have a negative impact on the flow, hence need to cool the gas. This is not to mention the additional work of civil engineering in relation to the trench, the costs that it induces and the effect on the environment.

The purpose of this article is to list the various problems encountered in the project of a gas pipeline from the technical, organizational and economic point of view. Partial solutions for each case will be offered as well as an optimal solution for improving the performance of a gas pipeline.

Keywords: performance; costs, optimization, heat transfer, reliability. **Main Conference Topic:** Transport

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Introduction

To increase the profitability of a gas pipeline, it is interesting to use larger diameter structures and transport gas under high pressure. Performance increases were possible through the improvement of the mechanical properties of the steel used in the manufacture of tubes. Table I.2 collects the minimum mechanical properties for steel pipelines. Research on the development of high-strength steels are essential. For X 100 steel, they began of 1978 and continues still.

Acier	Yield strength		Tensile strength	Elongation
	(ksi)	(MPa)	(MPa)	(%)
API-X65	65	448	530	24
API-X70	70	483	566	23
API-X80	80	551	620	22
API-X100	100	690	770	25

Table I.2: Required mechanical characteristics of pipeline steel grade API

The optimal parameters choice of a gas pipe is a fairly complex problem which resolution requires taking into account an important number of factors. Nowadays the recurrent questions that are asked are: the optimization criteria choice; the parameters to be introduced and the possible different variants. It should choose:

– A pressure,

- A canalisation,
- The compressor stations.

Save on the line (by choosing a smaller diameter) or the station equipment (in reducing the number) increases the energy expenditure of recompression. Similarly, to save the energy of recompression led to a more significant investment (in-line for example).

The gas flow in the pipeline is expressed by:

$$Q = 0.785 D^{2.5} P_i \sqrt{\frac{1 - (1/\epsilon^2)}{Z.R.T.\lambda.l_{sc}}}$$

(1)

Where : D- internal diameter of pipeline; P_i – initial pressure in the pipeline section; $\varepsilon = P_i/P_f$ –compression ratio; P_f – final pressure; T and Z- mean values of the temperature and the compressibility coefficient; l_{sc} – pipeline section length between two neighboring stations; R- characteristic parameter of the gas.

1. Influence of different factors

1.1.Influence of the conduct diameter.

In this equation we note the important role attributed to the pipeline diameter and its influence on the gas pipeline rate flow. Nowadays this problem has been solved by the increase, due to the technological progress, of the pipeline diameter up to 1420 mm for pressures of 75 kgf/cm² and more. However this increase doesn't occur without inconvenient. In fact the diameter increase goes with construction and exploitation problems.

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The construction problems:

- 1) The necessary increase of the thickness \Rightarrow increases the weight of the pipeline and her rigidity.
- 2) The increase of the thickness and mass = welding problems and problems in the construction of the pipeline sections.
- 3) The diameter increase requires \Rightarrow a greater hold and an increase in the civil engineering works.
- 4) With the pipeline diameter increase = increase of the contact surface with the ground = an increase in the coating volume ⇒ greater deterioration risk during the landing and the exploitation of the pipeline.
- 5) The coating volume increase = more important expenses for the pipeline cathode protection.

Technological problems:

The increase of the pipeline diameter = an increase of the compressors power and the increase of the gas temperature.

The compressor station power.

$$N_{SC} = B \frac{m}{m-1} \cdot Q \cdot T_{asp} \left(\epsilon^{\frac{m-1}{\eta,m}} - 1 \right)$$
(2)

m – Gas adiabatic coefficient; Q – transported volume rate flow; T_{asp} – admission temperature; ϵ – compression ratio; η – the efficiency if the transformation is polytropic; This power is directly proportional to the transported rate flow Q, that is to the diameter power 2.5 (formula 1) which gives us this equation:

- If D increases, then Q increases, then the compressor power N_{SC} increases, then the use of a more powerful entraining turbine.

This means that the temperature at the compressor discharge increases (formula 3)

$$Tref = Tasp.\varepsilon^{\frac{m-1}{m.\eta p}} (K)$$
(3)

For the turbines up to 25000 kW and more the gas temperature at the station outlet is fairly great. The temperature increase influences on the transported rate flow (formula 1) and entrains a diminution in the pipeline reliability. In fact in one hand, the released heat will not have the time to dissipate in the environmental medium which entrains a gas temperature increase at the inlet of the next station; on the other hand there is a difficulty in maintaining the pipeline stability and a perfect coating against the corrosion.

We can conclude that the diameter increase doesn't entrain only advantages (rate flow increase) but inconvenient on the economical side.

The results of the research have shown that:

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- With the pipeline diameter increase, transport costs decreases; but this diminution slows down with the diameter increase. This is visible for diameters 1220-1420 mm (48" -56"). From this diameter the increase doesn't give appreciable economical effects.
- 2) The questions of ballast, welding, laying and hydraulic tests are more difficult to resolve than the use of a 48" diameter.
- 3) The economical diameter doesn't depend on the transport length, the available pressure at the origin, or on the required pressure at arrival.
- 4) It only depends on the rate flow Q and the retained working pressure.

1.2. Influence of the pipeline roughness

$$\lambda \cong 0,067 \left(\frac{2.\text{Ke}}{D}\right)^{0,2} \tag{4}$$

The study has shown that the roughness diminution from 30 to 10 microns can increase the flow by 4 to 6 % for a 56" diameter. The increase of the pipeline rate flow entrains an increase in the supplied powers on the compression stations. This entrains an increase in the temperature at the compression station inlet and outlet.

1.3.Influence of the operating pressure

The other important parameter which must be taken into account is the operating pressure. The transport of gas in economic conditions requires high pressures of transport and the use of high yield strength steels. In addition, the safety of installations asked a toughness to avoid the destruction of the structure by rapid spread of cracks.

The increase in operating pressure necessarily increases the quantity transported, but this increase, as for flow, has its limits. Indeed studies on optimization of gas pipelines problems are shown that beyond 75 kgf/cm² pressure transportation savings are not obvious. These studies are made for pressures of 55, 75 and 100 kgf/cm².

1.4.Bring the SC: way to increase the carrying capacity

The Increase of the capacity by doubling of the stations (or decrease the distance between latter) caused an increase in the power and, therefore, an increase in the inlet temperature of the stations. For one section of pipeline between stations,

$$T_{\text{ref }i+1} = T_{\text{asp}_{i+1}} \cdot \varepsilon^{b}$$
 Avec $b = (m-1)/(\eta_{p} \cdot m)$ (5)

On the other side the variation of the temperature on the section (neglecting the effect of Joule-Thompson)

$$T_{asp_{i+1}} = T_{si} + (T_{ref i} - T_{si}).e^{-al}$$
 (6)

a.l =
$$\frac{K.\pi.D_{ext}}{M.C_p}$$
.l (7)

K - coefficient of heat transmission; M - mass flow; Dext - external diameter of the pipe; T_I - initial temperature; Ta - ambient temperature; C_P - specific heat of the gas.

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(9)

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The link between the outlet temperature of the station and the surrounding ground temperature:

$$T_{\text{ref }i+1} - T_{\text{refi}} \frac{\varepsilon^{b}}{e^{al}} = T_{\text{si}} \cdot \varepsilon^{b} \cdot \frac{e^{al} - 1}{e^{al}}$$
(8)

Or

In order that the gas temperature at the inlet and outlet of two successive stations will not increase ie
$$\varphi \le 1$$
, we obtain from formula (9) the following condition:

 $\varphi = \frac{T_{\text{ref }i+1}}{T_{\text{ref }i}} = \left[\frac{Ts_i}{T_{\text{ref }i}} \left(e^{al} - 1\right) + 1\right] \frac{\varepsilon^b}{e^{al}}$

The realization of this condition in the pipeline exploitation real case, (compression ratio, discharge pressure, rate flow, diameter and ground temperature), requires that the gas discharge temperature exceeds the ground temperature of only 1.5 to 2 times. Knowing the average ground temperature we can say that this condition is impossible without gas cooling at the station exit. In the opposite case, the gas temperature increases from station to station up to a limit expressed by the relation (10). The temperature is limited by the coating type and the pipeline stability conditions.

1.5. Influence of the temperature

From relation (1) we note that the temperature influences not only in a direct manner the rate flow but also in an indirect manner. In fact, with the gas temperature diminution the compression coefficient diminishes, this entrains a rate flow increase.

By decreasing the temperature, at constant pressure, we reduce the transported gas specific volume, which permits to increase the canalization transport capacity. From the curves SPE/AIME, by considering natural gas transport at 8 MPa (mega Pascal) for a transport temperature lowered of 50°C to - 30°C, we observe that compressibility factor diminishes with the temperature from 0.92 to 0.72. We observe that the temperature incidence on the specific volume is clearly more important for natural gas than for a perfect gas case.

1) The decrease in the gas temperature, using the dry coolers until the temperature of the soil is a certain efficiency in the operation of gas pipelines. The decrease of the gas temperature to lower values is a means of increasing the reliability and efficiency of gas pipelines but requires the use of refrigerating machines.

2) As a result of the decrease in the temperature of the gas follows a decrease in the power of discharge of the station and an increase in the power of the cooling stations. The big challenge is the development of enough economic metal type and high reliability that can ensure greater resistance against deformation in thermal stresses along the path.

$$\frac{Ts_i}{T_{ref_i}} \le \frac{e^{al} - \varepsilon^b}{e^{al} - 1} \cdot \frac{1}{\varepsilon^b}$$

$$\frac{1}{T_{\text{ref}_{i}}} \leq \frac{1}{e^{al} - 1} \cdot \frac{1}{e^{b}}$$

$$\frac{\overline{T_{ref_i}}}{e^{al} - 1} = \frac{e^{al} - 1}{e^{al} - 1} \cdot \frac{1}{\epsilon^b}$$
$$\frac{e^{al} - \epsilon^b}{e^{al} - 1} \cdot \frac{1}{\epsilon^b} \approx 0.8$$

(10)

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a) Case of pipe buried in arid areas

The cooling of the gas during the transport by pipeline is a very effective way to increase the reliability and the flow of the gas in the pipe. The cooling of the gas is usually for economic reasons, by cooler that lowers the temperature up to 10 to 15 ° C above the temperature of the air. The seasonal variation in the temperature of the ambient air impacts negatively on the regime of operation of the line and compressor station. In summer the temperature of the gas at the exit station reached the 45-50 ° C in the northern regions of the planet, and up to 80 ° C in the North of Africa (before cooling).

b) Case of pipe buried in varying climatic zones

The temperature of the gas in the winter can reach in countries such as the Russia or Canada – 5° C; -10 °C and even more depending on stability cold metal forming the pipeline as well as ecological considerations. Thus the pipeline works year-round to diverse thermal regimes or it undergoes thermal deformations and movements along the path. This requires an anticorrosive insulation, stability against temperature fluctuations and adequate electrochemical protection.

c) Case of pipe buried in highly humid areas

During installation and operation of the pipe buried in highly humid areas, where the ground is not capable to protect the conduct against movements due the change of temperature, it can cause anticorrosive insulation deterioration and loss of the pipeline stability.

The heat exchange coefficient K for a same cooting $\lambda i = \text{const}$

$$\frac{1}{\text{K.D}_{\text{int}}} = \frac{1}{\alpha_1.\text{D}_{\text{int}}} + \frac{1}{2\lambda} \sum_{i=1}^n \ln \frac{D_{i+1}^{\text{ext}}}{D_i^{\text{int}}} + \frac{1}{\alpha_2.\text{D}_{\text{ext}}}$$

(12)

 $D_{l+1}^{ext} = D_{ext}^{l} + 2\delta_2$ - Outside diameter of the coating with coating thickness δ_2

 $D_1^{ext} = D_{int} + 2\delta_1$ (Outside diameter of the pipeline with δ_1 - thickness of the pipeline.



 D_{int} and D_{ext} – internal and external pipeline diameter; n – number of insulating layers; D_i – internal diameter of each layer; D_{i+1} – external diameter of each layer; α_1 – heat exchange coefficient between the product and the pipeline wall; α_2 – heat exchange

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coefficient between the pipeline external surface and the medium; λ_i – coating thermal conductibility coefficient; δi - thickness of each layer of insulation.

1) Cases where the pipeline passes through land with soil temperature above $0 \circ C$

$$\alpha_{2} = \frac{2\lambda_{s}}{D_{ext} \cdot ln \left[\frac{2h}{D_{ext}} + \sqrt{\left(\frac{2h}{D_{ext}}\right)^{2} - 1}\right]}.$$
(13)

 λ_s – The coefficient of thermal conductivity of soil;

h - Depth up to the axis of the pipeline.

 α_2 - Coefficient of heat exchange between the outer surface of the pipeline and the environment according to Forgheimer.

For this type of soil it is sufficient to lower the temperature of the gas at the exit station to the ground (10-15 ° C) temperature then in this case Ti \cong Ta,

$$T_f \approx T_a - D_j \cdot \frac{(P_i - P_f)}{al} \cdot (1 - e^{-al}) \rightarrow T_f < T_a$$

(14) If:

$$\frac{2h}{D_{ext}} > 2 \qquad \Longrightarrow \quad \alpha_2 \approx \frac{2\lambda_s}{D_{ext} . \ln \frac{4h}{D_{ext}}}$$

(15)

Example: For L = 118 km; Pi = 73 kgf/cm², Pf = 49 kgf/cm²; Ta = 287K; Al = 0.83; K = 1.7 N/m².K.; Dj = 0.35 K / kgf/cm² yields Tf (281K and Tm = 289K instead of 313 K if Ti = 330K we obtain an increase of 4% of the flow of the pipeline.

For a gas pipeline with good quality insulation we can neglect the thermal resistance of gas and soil. In this case for a layer of insulation:

$$K = \frac{1}{\frac{R_0}{\lambda is} ln \frac{R_n}{R_0}}$$

(16)

With λ is – coefficient of heat conductivity of the insulation, Do = 2Ro - Inner diameter of the pipeline, D_{ext} – Outside diameter of insulation. In function of the available data we can:

- Either determine the insulator thickness δ_{is} for a given temperature T_{ext} ;
- Or determine the pipeline temperature at the ground contact for a given insulator thickness $\delta_{is.}$



Diameter	Depth of	Forgheimer		
insulation	laying h ₀	Text	α_2	$q_{\rm L}$
Disol (m)	(m)	°C	Kcal/m ² .h.°c	Kcal/m.h
2,22	2,11	-0,17	2,12	15,85
1,98	1,99	-1,4	2,27	20,7
1,84	1,92	-3,1	2,4	27,8
1,64	1,82	-7,5	2,52	44,3
1,54	1,77	-17,9	2,62	85,4

Calculus of the α_2 coefficient:

1st Conclusion

For these reasons it is required to cool the natural gas, throughout the year, at the soil temperature surrounding the conduct. The choice of the appropriate temperature is determined, using hydraulic calculations and thermal of the compressor stations, cooling and the line taking account of the influence on the ecosystem.

The 2nd problem is the preservation of the immediate environment surrounding the conduct. For the pipelines buried, carrying gas at low temperatures, this problem worsens by the action of these temperatures on the ground. Application of insulating material to solve the problem entails the use of large amounts of insulation layers, resulting in an increase of constraints pose especially in the severe climatic regions of the North.

The calculations have shown that the gas transport at temperatures from 5 to 10° C influences the rate flow in a neglecting manner (around 4° increase). The cooling advantage resides on the contrary in the amelioration of the gas pipeline exploitation reliability.

Let's cite at the end the different type of solicitations which act on the pipeline:

 Pipeline proper weight; insulating coating weight; initial constraint due to pipeline elastic flexion; ground pressure on the pipeline; axial and circumferential constraints; transported gas weight; thermal constraints; snow charge etc. Multidisciplinary Academic Conference

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A Study of Adaptive Behaviors of Visitors to Macau in their Choice of Gambling Activity

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Abstract

The concept of adaptation is originated in biology, which refers to both the current state of an organism being adapted and to the dynamic evolutionary process that leads to the adaptation. The theory was introduced into study of gambling behavior. According to this theory, gamblers are capable of changing their behavior in response to the exposure of gambling opportunities. This study tested the theory by survey of visitors from Mainland China (visitors from Guangdong province and other provinces of China) and Hong Kong to Macao. The survey found that Hong Kong visitors were lest interested in casino gambling, followed by visitors from Guangdong province. The visitors from other provinces of China had highest interest. The differences were positively related to the difference of three place residents' duration of exposure to casino gambling. The longer time a place's residents were exposed to casino gambling, the lower participating rate of casino gambling. The survey results support adaptation theory.

Keywords: gambling adaptation visitor survey Hong Kong Mainland China **Main Conference Topic:** Transport, Tourism and Sport Science

Introduction

Casino Gambling is one of fastest growing industries in the world. In the past decade more and more countries or places have legalized casino gambling as a way to develop economies and tourism. To illustrate, in Asia after Macau opened its market to international operators in 2002, Singapore legalized its casino industry in 2005 and its first casino opened in 2010. Taiwan passed the gaming law in 2009, allowing construction of casinos on some off-shore islands. The Philippines and Russia are building new casinos. In the United States, since 1989, 21 states legalized commercial casinos (State of States: The AGA Survey of casino entertainment, 2013). With the growth of the industry, there has been a significant increase in academic interest in gambling behavior and the economic and social impacts of legal gambling. But so far, few studies have applied a theoretical framework to the study, and some have failed to articulate their assumptions (Vasiliadis, et al. 2013). Some researchers have proposed adaptation (including exposure) theory to guide the conceptualisation and empirical investigation of the relationship between availability of gambling opportunities and gambling involvement and problems (LaPlante & Shaffer, 2007). As Vasiliadis, et al.(2013) pointed out that there is some evidence that adaptation (and exposure) theories may provide an adequate model to examine risk factors over time and inform harm minimisation strategies aimed at supply regulation. The theory has been tested and confirmed in quite a few researches on problem gambling of residents of communities or areas. However, the research is still at its early stage, and the arguments supporting adaption theory are far from conclusive (Vasiliadis, et al. 2013; Abbott, 2007). This research hopes to narrow the gap by surveying visitors from Hong Kong and Mainland China and test the validity of the theory.



The study could help academic research have a better understanding of the theory and provide policy makers and casino operators with practical implications for the development of the casino industry as part of tourism facilities. It is very important for tourism destinations with gambling facilities as main attractions to understand the future trends of visitors. If visitors adapt to gambling activities quickly, then it means that the attraction of the casinos won't last long, and the destinations must invent new attractions quickly. The tool can be used both by casino operators and decision makers of government in their making plans for the future.

Review of Literature

The concept of adaptation

The concept of adaptation originated from biology, which refers to both the current state of an organism being adapted and to the dynamic evolutionary process that leads to the adaptation. Organisms face a succession of environmental challenges as they grow and develop. In response to the imposed conditions they are equipped with an adaptive plasticity(Corning, 2000; Kantor, 1977). Huxley pointed out that adaptation is universal among organisms, and every organism is but a bundle of adaptations (p.420). Adaptations contribute to the fitness and survival of organisms.

As gambling is concerned, the adaptation process happens between visitors and their gambling settings. When visitors first experience gambling opportunities (exposure to a new environment), they will feel excited and have high participating rate of gambling and have high rate of problem gambling, however if they have been exposed to the gambling opportunities for a long time, the novelty of gambling will decrease and their interest for gambling will decline and thus lead to lower rate of gambling participation and lower rate of problem gambling (adaptation to the environment).

The "adaptation" perspective does appear to have support in the empirical literature. A review of prevalence research reveals that estimates of pathological gambling in the general population, ranging from less than 1% to 1.9%, have been fairly stable over the past three decades from study to study, time to time, and place to place despite the dramatic increase in legalized gambling in the United States during this period (LaPlante & Shaffer, 2007; National Center for Responsible Gaming, 2009). The prevalence rates are also similar and stable across the globe despite differences in culture and access to gambling opportunities, as well as divergent research methods and measures (National Center for Responsible Gaming, 2009, p.6).

Macau's Gambling Industry & Visitors

Macau's gambling has a very long history. As early as 1847, the Portuguese- Macau Government issued a decree declaring the legalization of gambling in Macau and in 1849 Macau issued first license for a gambling house. In 1877, three gambling games, i.e. Fan-Tan, Pai Kao, Big-Small, were allowed in some places in Macau, and license fees levied on the premises concerned. In 1910 Macau had 15 casinos, which employed 143 employees. In 1930 Macau established its first gaming franchisee and in 1961, the Portuguese government issued a decree to turn Macau officially into a tourist area and gaming area (Geng Hu, 2009). From 1849 till now, Macau has casino gambling for more than 160 years.

Macau's visitors now mainly consisted of visitors from mainland China and Hong Kong. The two groups made up about 88 percent of Macao's visitors. Among the 88 percent, Mainland China visitors make up about 67%, and Hong Kong visitors make up about 21% (2016). But before 2003, Macau's tourism market was dominated by Hong Kong visitors.

Hong Kong visitors. Hong Kong residents has been exposed to casino gambling for a long time. Macau's gamblers were once dominated by Hong Kong visitors. In 1961, the



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earliest visitor figure available, Macau has 741813 visitors, of which 72% were from Hong Kong. From 1970 to 1978 about 90% of Macao's visitors were from Hong Kong every year (Huang & Wu, 1994). From 1985 to 1992, more than 80% of visitors were from Hong Kong (Macau Year Books of years). From 1993 on, the percentage of Hong Kong visitors began to decline gradually because of increase of Mainland visitors and Taiwan visitors. In 1999, the year when Macau was returned to China, Macau had 7.4 million visitors, of whom, 54% were from Hong Kong, and only 22% were from Mainland, and in 2003 for the first time the number of Mainland visitors overtook that of Hong Kong visitors and became the dominant visitors to Macau.

Because of long time exposure to Macau's casino gambling and extensive exposure of its population, we have the following hypotheses about Hong Kong visitors' gambling behavior in Macau

Hypothesis 1 Because of long exposure to Macau casino gambling, Hong Kong visitors to Macau have a lower participating rate in casino gambling in Macau than residents from other places

Guangdong visitors. Since 2003, Mainland visitors has overtaken Hong Kong visitors in numbers and become the biggest visitor group to Macau. Among visitors from Mainland, Guangdong visitors are the largest section because of Guangdong's proximity to Macau. Guangdong was the first place open to individual visitor scheme. In 2003 10 Mainland cities were open for visitors to Macau on individual scheme (the visitors can come to Macau by themselves instead of traveling with tourist groups organized by travel agencies), 8 cities were in Guangdong. The other two were Beijing and Shanghai. In 2004, the rest 13 cities of Guangdong were opened for individual visitor scheme, however, other 29 provinces and municipalities of Mainland had only two provinces opening for the scheme. In 2010 and 2011(the earliest data available), more than half of Mainland visitors were from Guangdong Province. In the second half of 2010, the first time when the province figures for Chinese visitors were provided, 52% of Mainland visitors were from Guangdong visitors can come to Macau easily, they have been exposed to casino gambling longer time than visitors of other Chinese visitors. Thus we have the following hypothese:

Hypothesis 2 Guangdong visitors have lower participating rate in Macao's casino gambling than visitors from other places of Mainland China because of more exposure to Macau's casino gambling than the visitors from other places.

Hypothesis 3 Guangdong visitors have higher participating rate in Macao's casino gambling than visitors from Hong Kong because of less exposure to Macau's casino gambling than the visitors from Hong Kong.

Methodology

This research will test the hypothesis by survey of visitors from the 3 places to Macao.

Sample

The research focuses on mainland and Hong Kong visitors, aged 18 or above, who have completed their trip in Macau and are returning home. The survey was conducted at three exit points on the Macau border. For mainland visitors, the sample was drawn up at Gongbei Border Gate of Zhuhai, the China mainland city adjacent to Macau. Prospective participants were crossing border inspection points into mainland China after travelling to Macau.

Instruments

This survey included demographic information and their activities in Macau. As gambling is regarded as a stigma for most visitors, especially for visitors from Mainland China, most visitors don't want to admit that they came to Macau mainly for gambling. To



illustrate, the quarterly visitor survey conducted by Macau Statistic Bureau found the percentage of the Mainland visitors whose main purpose of visiting Macau was for gambling was very low. In the fourth quarter of 2012, the percentage was only 4%, and in the fourth quarter of 2013, the percentage was 5%. In order to avoid embarrassment of the visitors, we didn't ask if their purpose or visiting Macau is for gambling or not, we just ask what activities they had done in Macau with a list of 10 activities including: 1) business; 2) leisure or vacation; 3) visiting friends/relatives, 4) sightseeing; 5)casino gambling; 6) shopping; 7) enjoying delicacy; 8) Business; 9) watching performances or shows; and 10) others.

Data collection procedure

This survey was undertaken over the course of 3 months. Prospective participants were intercepted randomly by researchers and assistants. Twenty research assistants participated in this investigation and helped to distribute the questionnaires at the abovementioned locations between Mondays and Sundays during the specified period. All assistants were provided with training prior to conducting the survey. The interception method was used which has been a commonly used approach to profiling visitor information and can help to elicit immediate responses. In the case of the present investigation interviews lasted an average of 6 to 8 minutes. On completion of the survey, participants were presented with a small gift as a token of appreciation. A total of 2,999 valid responses were generated from Hong Kong visitors and a further 1204 were gathered from mainland visitors. Of the 1204, 826 were from Guangdong Province, 368 from other places of Mainland China and 10 were not responsive. SPSS17.0 was used for the analysis of the data

Findings

Demographic characteristics

Gambling visitors (GVs) and Non-Gambling visitors (NGVs) of Mainland China It was found that the demographic characteristics between GVs and NGVs were significantly different at p<0.001. Most GVs were male (57%), whereas NGVs were predominantly female (66%). Most GVs were over 25 (71%) and married (75%). The equivalent proportions for MNGVs were 46% and 57% respectively. The results indicate that a relatively higher number of MGVs occupied management or professional positions and were self-employed. MNGVs generally had higher education and income levels than their MGV counterparts. The results indicate that most of the Southern China respondents (including those from Guangdong and other areas adjacent to Macau) were MNGVs. A minority were NGVs. Perhaps unsurprisingly in view of the proximity of Guangdong, most of the 568 MGVs (61%) originated from other Chinese provinces are crossing the border to undertake gambling activities.

Hong Kong gambling visitors (HKGVs) and Hong Kong non-gambling visitors (HKNGVs) Hong Kong visitor responses indicate that most HKGVs were married (60%) and male (66%). There was no major difference between the gender and marital status of HKNGVs. Compared to visitors who engaged in gambling activities; non-gambling visitors were more educated and held management and professional positions. Most HKGVs were medium income earners.

MGVs and HKGVs Results show that MGVs and HKGVs share a lot in common in their demographic characteristics. They were middle aged, male and married. Most of these gambling visitors did not have a university degree and had only completed high school. Surprisingly, a high percentage of the two groups were either self-employed or held sales positions.
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MNGVs and HKNGVs There were some similar and different demographic characteristics across the two groups. The results indicate that most of the two groups were single, middle-aged females. Most were highly educated and possessed university degree qualifications. However, more HKNGVs reported as having medium incomes and holding professional positions; whereas most MNGVs were low-income earners, holding clerical or secretarial positions. The relevant findings are presented in Table 1.

		GVs			HKNGVs
Category	Variable	%	NGVs %	HKGVs %	%
1. Gender	2. Male	3. 57%	4. 34%	5. 66%	6. 51%
7.	8. Female	9. 43%	10. 66%	11. 34%	12. 49%
13. Age	14. 25 or less	15. 17%	16. 37%	17. 12%	18. 24%
19.	20. 26-45	21. 57%	22. 49%	23. 63%	24. 59%
25.	26. 46 above	27. 26%	28. 14%	29. 26%	30. 17%
31. Marital status	32. Married	33. 75%	34. 57%	35. 35%	36. 47%
37.	38. Single	39. 22%	40. 40%	41. 60%	42. 51%
43.	44. Other	45.4%	46.3%	47.5%	48. 2%
49. Occupation	50. Management	51. 15% 52. 12%		53.8%	54. 10%
55.	56. Professional	57. 27%	58. 20%	59. 18%	60. 24%
61.	62. Sales	63. 7%	64. 5%	65. 23%	66. 17%
67.	68. Clerical	69. 23%	70. 61%	71. 19%	72. 23%
73.	74. Other	75. 27%	76. 2%	77. 32%	78. 26%
79. Education	80. High school*	81. 60%	82. 40%	83. 72%	84. 52%
85.	86. College**	87. 40%	88. 60%	89. 28%	90. 48%
91. Income	92. Low	93. 73%	94. 85%	95.4%	96. 5%
97.	98. Medium	99. 16%	100. 12%	101. 58%	102. 53%
103.	104. High	105. 11%	106. 3%	107. 22%	108. 22%
109. Place of origin	110. Guangdong	111. 40%	112. 23%	113.	114.

Table 1: Mainland and Hong Kong Visitors – Demographic Profiles

Notes: GVs – Mainland gambling visitors, NGVs = mainland non-gambling visitors, HKGVs = Hong Kong gambling visitors, HKNGVs = Hong Kong non-gambling visitors

*Refers to high school or below; **Refers to college or above

Gambling participation rates

The study found that the visitors from Hong Kong were least interested in casino gambling when they visited Macao. The percentage of people who gambled in a casino during their stay is 27%. The percentage for visitors from Guangdong 41%, while the visitors from Mainland places other than Guangdong, the percentage is 61% (Table2).

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	Hong Kong	GD	Non-GD	Total
115.Total	116.2999	117.826	118.368	119.4193
120.Gamblers	121.801	122.341	123.223	124.1365
125.%	126.26.7%	127.41.3%	128.60.6%	129.32.6%
130.Non- Gamblers	131.2198	132.485	133.145	134.2828
135.%	136.73.3%	137.58.7%	138.39.4%	139.67.4%

 Table 2 The Percentage of Gamblers and Non-Gamblers of Visitors from 3 Places

P=0.001

Hypothesis 1 were all supported. Hong Kong visitors to Macau had a gambling participating rate of 26.7%, much lower than 41.3% of the visitors from Guangdong and 60.6% of the visitors from other provinces and municipalities of Mainland China.

Adaptation of Hong Kong visitors were also supported by prevalence survey of Hong Kong residents. From 2001 to 2011, Macau's casinos have been increasing from 11 to 35, and gambling tables increasing from 339 to 5750. If we use the exposure measure proposed by Shaffer et al.(2004) or Productivity Commission of Australia (1999), it means that the exposure of Hong Kong residents to casino gambling has increased significantly. Without adaptation, the percentage of gamblers of Hong Kong residents should increase significantly, however, the percentage of Hong Kong residents involved in Macau's casino has a declining trend. In 2001, the percentage is 12.1%, and in 2011, the percentage is only 11.9%. And the monthly median betting money is HK\$100, without any change since 2001(Table 3).

Table 3 Percentage of HK People involved in gambling in the past year

	% of Pop. involved		Problem & Path. gambling		% involved in M. casinos		Monthly median betting money in M casinos		
140.	2001 141.	77.8%	142.	5.8%	143.	12.1%	144.	HK\$100	
145.	2005 146.	80.4%	147.	5.3%	148.	15.8%	149.		
150.	2008 151.	71.3%	152.	4.5%	153.	10.8%	154.	100	
155.	2011 156.	62.3%	157.	3.3%	158.	11.9%	159.	100	
160.	2016 161.	61.5%	162.		163.	8.4%	164.	167	

Hypotheses 2 and 3 were also supported. Guangdong visitors have a higher gambling participating rate than that of Hong Kong while have a lower participating rate than that of other provinces and municipalities of Mainland China.

Discussion

The findings are very valuable for judging the future of the gambling industry and for a gambling destination to plan for the future. As the adaptive behavior is happening on all visitors, we may conclude that a destination that depends on gambling as the only major attraction for visitors is too risky. Innovation in gambling games or entertainment other than gambling is necessary for keeping the prosperity of a gambling destination.

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Using the Model of Goal Directed Behavior to Assess Mainland Chinese Tourists' Gambling Behavior

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Abstract

Using the Model of Goal-directed Behavior (MGB) as a theoretical framework, the purpose of this study was to examine mainland Chinese tourists' behavioral desire and behavioral intentions to gamble in casinos when they traveled to Macao. Consistent with the theory, the results of a structural equation analysis revealed that attitude, positive anticipated emotion, negative anticipated emotion and past behavior affected desire, which, in turn, influenced the behavioral intention. Subjective norm and perceived behavioral control had no impact on desire, but perceived behavioral control directly affected mainland Chinese tourists' gambling behavioral intention. The findings of this study will shed light on better understanding of the decision-making processes of mainland Chinese tourists' gambling activity considering gambling is illegal in mainland of China.

Keywords : Chinese tourists, Casinos, Consumer behavioral intention, Model of goaldirected behavior

Main Conference Topic: Tourism

Introduction

Gambling, an activity historically associated with negative effects, has become more socially acceptable universally as an acceptable leisure-time pursuit. In recent years, more and more countries have legalized gambling to attract overseas tourists.

In the field of gambling research, majority of published research has focused on problem gambling behaviors (Walker 2013). Non-problem gambling research has only recently surfaced, focusing on the economic and social impacts of casinos in specific locales(Song, Lee, Norman, et al. 2012), casino service-quality (Brady & Cronin 2001) etc. Overall, recreational gamblers' consumer behavior in overseas casinos has thus far received little theoretical treatment in scholarly literature, despite the billions of dollar spent in casinos by tourists traveling abroad.

It has been predicted that outbound travel from China will grow to 138.7 million tourists by 2020(Lin et al. 2015). Although casino gambling is illegal in mainland China, most mainland Chinese tourists partake in the activity when traveling abroad. For most mainland Chinese tourists, Macao is the most popular gambling destination. This study examines mainland Chinese tourists' decision making and gambling behavior with regard to casinos in Macao using the Model of Goal-directed Behavior (MGB).



Conceptual Framework

1. TRA, TPB, and MGB

About four decades ago, Fishbein & Ajzen(1975) put forth the theory of reasoned action (TRA) to explain the relationship between attitudes and behavior. In response to the TRA's limitations, Ajzen (1985) added the concept of perceived behavioral control (PBC) to the TRA as a third predictor of intention and proposed the Theory of Planned Behavior (TPB). Several meta-analyses have shown that behavioral intention can be predicted from the three components of the TPB with reasonable accuracy (cf. Armitage & Conner 2001). However, the level of prediction is far from perfect.

Starting from the premise that TPB lacks theoretical sufficiency, Perugini & Bagozzi (2001) proposed MGB to explain individual behavior. According to the MGB, intention to perform a behavior is primarily motivated by the desire to perform the behavior, and this behavioral desire is assumed to reflect the effects of attitude, subjective norms, perceived behavioral control, and anticipated emotions. Anticipated emotions, also called affective forecasts, are predictions of the emotional consequences of decision outcomes (Bagozzi & Pieters 1998). Positive anticipated emotions result in progress towards goal attainment, while negative anticipated emotions result in movement away from goal attainment(Gleicher et al. 1995). Finally, past behavior was also introduced in MGB. Incorporating these new variables provides the MGB with greater predictive ability as compared to TPB (Carrus et al. 2008).

2. Hypothesized relationships

2.1 Attitude and desire

Both the TRA and the TPB indicate that the effect of attitude on future behavior is completely mediated by intention. In the MGB, Perugini & Bagozzi(2001) proposed that the concept of desire is distinct from that of intention in that it constitutes the motivational drive towards intention. Perugini & Conner(2000) defined behavioral desire as "the motivational state of mind wherein appraisals and reasons to act are transformed into a motivation to do so." Behavioral desire is the most proximal antecedent of intention. Therefore, an individual's attitude affects intention indirectly through desire (Perugini & Bagozzi 2001). In some tourism consumer behavior studies (cf. Song, Lee, Kang, et al. 2012), desire has been found to be an important mediating variable between attitude and behavioral intention. We therefore propose that:

H1: Attitude has a positive influence on the desire to gamble.

2.2 Subjective norms and desire

Subjective norm is based on the individual's perception of whether important reference groups support or reject the behavior(Ajzen 1991). In the TRA and TPB, subjective norm is a significant factor in the formation of behavioral intention. In the MGB, subjective norm, like attitude, is deemed to have an effect on behavioral intention indirectly through desire. Some studies based on the MGB reveal that subjective norms fortify an individual's desire significantly (Prestwich et al. 2008). If an individual believes that other people perceive casino gambling as positive, the individual's desire to gamble will be augmented. We therefore propose that:

H2: Subjective norm will be positively correlated with desire to gamble.

2.3 Anticipated emotions and desire

Decision making involves emotional processes: A decision maker generates imagined alternative consequences to goal success and goal failure, which then serve as inputs for appraisal, and the generation of anticipated emotional responses(Tsai & Bagozzi 2014). In situations of uncertain future, people may have developed forward-looking associations between emotions and behaviors. Gleicher et al.(1995) called these anticipated emotions "prefactuals" and stated that this concept can have an effect on intentions and behaviors by



motivating avoidance of negative emotions and promoting positive affect. Therefore, two anticipated emotion variables (positive anticipated emotion and negative anticipated emotion) are included in the MGB. Positive anticipated emotion results in progress towards goal attainment, and negative anticipated emotion results in movement away from goal attainment(Gleicher et al. 1995). Empirical research in tourism has addressed such anticipated emotions with respect to travelers' green hotel consumption(Han & Yoon 2015), medical tourism behavior(Song et al. 2014) etc. We therefore propose that:

H3: Positive anticipated emotion has a positive effect on gambling desire.

H4: Negative anticipated emotion has a negative influence on gambling desire.

2.4 Perceived behavioral control, desire, and behavioral intention

In MGB, perceived behavioral control is considered a vital factor in promoting desire. When necessary resources or opportunities to perform a behavior are fully present, desire and behavioral intention for the specific behavior tend to be strengthened (Perugini & Bagozzi 2001). A number of studies on tourism behavior have demonstrated that an individual's selfconfidence or ability to perform specific behaviors positively influences desire and behavior intention(Song et al. 2014). If an individual has enough resources or opportunities to visit a casino, this perceived behavior control will strengthen desire and behavioral intention for gambling. For gamblers from mainland China, gambling on the mainland is illegal, and travelers have to apply for travel visa when they want to go to Macao. In other words, for mainland Chinese gamblers, the perceived ease or difficulty involved in gambling will be different from gamblers in other countries. We therefore propose that:

H5: Perceived behavioral control has a positive effect on desire to gamble in casinos.

H6: Perceived behavioral control has a positive effect on behavioral intention to gamble in casinos.

2.5 Past behavior, desire, and intention

Past behavior impacts future behavior in two different ways -- habit formation and intention formation(Ouellette & Wood 1998). In some meta-analysis studies, past behavior has been identified as a significant predictor of future behavior (cf. Hagger et al. 2002). Perugini & Bagozzi (2001) argue that frequency of past behavior influences desire, intention, and behavior. In tourism context, Lam & Hsu (2006) found that past behavior was a significant predictor of travelers' intention of choosing a destination. We therefore propose that:

H7: Mainland Chinese tourists' past gambling behavior has a positive effect on desire.

H8: Mainland Chinese tourists' past gambling behavior has a positive effect on behavioral intention.

2.6 Desire and behavioral intention

Davis(1984) writes, "the principle that intention entails desire can be expressed as follows: someone intends to do something only if he is motivated to do it." Desire, therefore, is a primary predictor of intention Song, Lee, Kang, et al.(2012). In Perugini & Bagozzi's studies(2001), desire was revealed to mediate the original three antecedents of TPB and intention. In other words, desire accounts for a greater proportion of the total variance in behavioral intention(Perugini & Bagozzi 2001). Numerous studies in tourism research(Song, Lee, Kang, et al. 2012; Song et al. 2014) also suggest that desire is a strong predictor of intention. We therefore propose that:

H9: Desire has a positive influence on behavioral intention to gamble among mainland Chinese tourists.

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Methodology

1. Questionnaire development

Data on mainland Chinese tourists who took part in gambling activities on their trip to Macao were collected using a structured questionnaire. All items of the instrument were adapted from previously published work with needed wording changes. For MGB-specific items, we adapted the instrument used by Song, Lee, Norman, et al.(2012) in their study on behavioral intentions of Korean casino visitors.

2. Data Collection

An intercept survey of mainland Chinese tourists was conducted for gathering data. Only respondents who had gambled in casinos were invited to participate in the survey. A total of 367questionnaires were gathered. After a thorough examination, 97 questionnaires were eliminated from the analysis because of missing and patterned data. Overall, 270 questionnaires were coded and used for analysis.

Results

1. Respondent profile

The present research utilized SPSS and AMOS for data analysis. The proportion of male respondents (74.8%) was higher than that of female respondents (25.2%). Most respondents were single (66.7%), aged between 26-40 years (62.6%), had an undergraduate degree or higher (52.1%), and earned between RMB 5001-15000 per month (72.6%).

2. Correlation Measures for Constructs

Table 1 provides descriptive statistics and inter-correlations for the six constructs used in this research. On the whole, the measures of normality are not excessively skewed and had reasonable variation. The magnitude of correlations suggests that all the gambling-related behavior measures were statistically correlated. Attitude, social norm, perceived behavioral control and positive anticipated emotion were strongly correlated with strength of desire (r=.757, r=.589, r=.675, r=.620, respectively). Contrary to expectation, negative anticipated emotion showed a positive significant correlation with desire(r=.386). Gambling desire was strongly correlated with gambling behavior intention (r=.823).

	1	2	3	4	5	6	7	Mean	Std.Dev.
1.AT	(.776)							3.5237	.78893
2.SN	.612**	(.886)						2.8509	1.04821
3.PAE	.605**	.474**	(.920)					3.7806	.99288
4.NAE	.339**	.203**	.478**	(.867)				3.4741	1.17390
5.PBC	.699**	.648**	.663**	.395**	(.815)			3.3898	.99447
6.DE	.757**	.589**	.620**	.386**	.675**	(.888)		3.0917	1.06620
7.BI	.686**	.621**	.562**	.286**	.663**	.823**	(.885)	3.1102	1.03073

Table 1 Descriptive data, correlations among measures and discriminant validity

N=270 *** significant at the .001 level; ** significant at the .01 level; * significant at the .05 level

3. Convergent Validity

Table 2 shows that all factor loadings, composite reliability coefficients, and AVEs meet the recommended guidelines, indicating that the convergent validity for the proposed constructs of the measurement model was adequate.



Latent variable	Scale Item	Factor	t-Value	AVE	Composite	
		Loading			Reliability	
Attitude(AT)	AT1	.686		.6023	.8181	
	AT2	.878	12.821			
	AT3	.752	11.411			
Subjective Norm (SN)	SN1	.909	21.542	.7854	.936	
	SN2	.901	21.110			
	SN3	.863	19.520			
	SN4	.871				
Perceived Behavioral	PBC1	.729	12.219	.6646	.8875	
Control (PBC)	PBC2	.873	15.317			
	PBC3	.858	21.732			
	PBC4	.793				
Positive Anticipated	PAE1 PAE2	.916	21.954	.8456	.9653	
Emotion (PAE)		.935	26.855			
	PAE3	.913	24.991			
	PAE4	.914				
Negative Anticipated	NAEI	.931	11.645	.7516	.9231	
Emotion (NAE)	NAE2	.949	11.914			
	NAE3	.796	20.923			
	NAE4	.778				
Desire (DE)	DEI	.882		.7894	.9374	
	DE2	.882	20.966			
	DE3	.934	17.974			
	DE4	.854	16.164			
Behavioral Intention	BH	.872	18.609	.7729	.9315	
(BD)	BI2	.890	19,479			
	B13	.912	20.004			
	BI4	.841				

Table 2 Results of Measurement Model

4. Discriminant Validity

Discriminant validity was assessed by comparing the square root of the average variance extracted for each construct with the correlations between that construct and all other constructs. In Table 1, the diagonal elements in the correlation matrix have been replaced by the square roots of the average variance extracted. The values suggest adequate discriminant validity at the construct level for all the variables in the model.

5. Measurement Model

We use the χ^2 statistic, standardized root mean residual(SRMR), root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI) to assess the model fit. All values except χ^2 satisfied the recommended level of acceptable fit.

6. Structural Model Test and Hypotheses Testing

Having ascertained adequacy of the measurement model, underlying hypotheses were tested using the structural model. As presented in Figure 1, all indices except χ^2 indicated an acceptable model fit (χ^2 =810.453; χ^2 /df=2.517; SRMR=0.043; RMSEA=0.075; CFI=0.935; TLI=0.924). For hypothesis testing, path coefficients which show the relationship between all variables analyzed in the hypothetical structural model (Figure 2) were defined using maximum likelihood estimation methods, and the critical ratio (CR) was evaluated through the statistical significance of the parameters. In the empirical model, the relationships between subjective norm (SN) and desire (DE) (path coefficient=-0.062, CR=-0.870), perceived behavioral control (PBC) and desire (DE) (path coefficient=0.094, CR=0.975), and past behavior (PB) and behavioral intention (BI) (path coefficient=0.018, CR=0.386) were not significant as the correlation coefficients are low and CR is less than±1.96. Thus, H2, H5 and H8 were not supported.



Figure 1: Validation Results of Proposed Research Model **p<0.05, ***p<0.01

All hypothesized variables except subjective norm (SN) and perceived behavioral control (PBC) were significant predictors of desire(DE): attitude(AT) (path coefficient=0.674, CR=7.567), positive anticipated emotion (PAE) (path coefficient=0.178, CR=2.739), past behavior (PB) (path coefficient=0.203, CR=4.047), supporting H1, H3 and H7. Contrary to expectations, negative anticipated emotion (NAE) (path coefficient=0.130, CR=2.832) was statistically significant in predicting desire, opposite to what was hypothesized. So, H4 was rejected.

The relationships between perceived behavioral control (PBC) and behavioral intention (BI) (path coefficient=0.234, CR=3.748), and between desire (DE) and behavioral intention (BI) were positive and significant, supporting H6 and H9. As was anticipated, attitude, positive anticipated emotion, and past behavior played a significant role in explaining the desire formation of the mainland Chinese tourists to gamble while perceived behavioral control and desire served as important antecedents in predicting the mainland Chinese tourists' behavioral intention to gamble.

Discussion

Mainland Chinese are viewed as among the biggest casino gamblers in the world, despite the fact that casinos are illegal in mainland China. Little research has been conducted on the factors influencing mainland Chinese tourists' gambling behavior.

This study test the predictive validity of MGB in the context of mainland Chinese tourists' casino gambling. As expected, the relationship between attitude and desire, positive anticipated emotion and desire, positive behavioral control and behavioral intention, and past behavior and desire was statistically significant. The one puzzling finding was the positive significant relationship between negative anticipated emotion and desire. This finding adds to previous inconsistent findings regarding the effect of negative anticipated emotion and desire. For example, Perugini & Bagozzi(2001) and Song, Lee, Kang, et al.(2012) found that negative anticipated emotion had no influence on desire, while Han & Yoon (2015) reported that negative anticipated emotion had a significant and negative impact on desire. Future research needs to explore these inconsistencies.

Also observed in this research were the insignificant relationships between subjective norms and desire, and perceived behavioral control and desire. Our finding is consistent with the findings of Song, Lee, Norman, et al. (2012) who argue that the insignificant relationship between the subjective norm and desire might be attributable to the characteristics of the study sample.

Perceived behavioral control had a significant positive relationship with behavioral

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intention but not desire. Recall that behavioral control refers to the apparent ease or difficulty of performing a behavior. For many Chinese overseas visitors, the ease or lack thereof to go gambling overseas is determined by government authorities. Once the travel restrictions and formalities have been accounted for, perceived behavioral control would have a positive relationship with behavioral intention.

As for the effects of the past behavior on desire and behavior intention, past behavior was only significant in affecting desire, not behavior intention. A similar result was also reported in the work of Song, Lee, Norman, et al.(2012), where that past gambling behavior was not related to intention to participate. It appears that desire is an important mediating variable between past gambling behavior and gambling behavioral intention.

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Developmental Perspectives of Religious Tourism on an Island Group. A Case Study of the Cyclades islands.

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Abstract

Religious tourism is a specific aspect of cultural tourism, mainly focused on particular resources, which are not necessarily the churches, the temples, the monasteries and other sacred sites, but all the elements that relate to the religion and the religious sentiment. It may, also, directly relate to other elements of the local culture, to which the religions are also intricately linked, as well as to the natural environment. Therefore, even in the case that apparently "one-dimensional" resources, easily distinguishable from the rest, are examined, the reality is different. Consequently, the activities that may relate to the religious tourists' individual "typologies" are manifold and relate to other alternative forms of tourism.

The present study examines the Cyclades island group and investigates whether this tourist destination can attract special forms of tourism and, in particular, religious-cultural tourism, either self-reliantly or combined with other alternative forms of tourism. Through this study, which was held within the framework of the World Tourism Organization's Observatory of Tourism, each of the Cyclades island's resources were thoroughly recorded and described and, in particular, the religious-cultural ones. Furthermore, their distinctive features were analyzed, the role played by the local community was investigated and suggestions regarding the rational utilization of the islands' religious-cultural resources were made.

Keywords: Religious-cultural tourism, Cyclades islands, Slow tourism, "Gate" **Main Conference Topic:** Tourism, Religious Tourism

The Cyclades islands as a destination

The prefecture of the Cyclades is an island group consisting of 147 Greek islands and islets, extending to the Southwest Aegean, amongst Crete, Peloponnese, Evia and the Dodecanese. The prefecture's total area amounts to 2,572 sq.klm, the coastline 2,051 klm, while the whole population reaches 112,615 inhabitants. The prefecture's capital is Ermoupolis on the island of Syros.

The Cyclades' major islands are Naxos, Andros, Tinos, Paros, Kea, Milos, Amorgos, Ios, Syros, Kythnos, Mykonos, Sifnos, Serifos, Thira (or Santorini), Sikinos, Kimolos, Folegandros, Anafi, Antiparos, Gyaros, Irakleia, Makronisos, Polyaigos, Rinia, Donoussa, Keros, Therasia, Despotiko and Delos. A great number of islets and microislets exist around those islands (Moí $\rho\alpha$, 2005, σ . 293).



The Cyclades' history

The Cyclades were created millions of years ago, through the geological disarray events that took place in the southeast Mediterranean region. The islands' specific shape and soil composition are attributed to these disarray events, the earthquakes and the volcanic eruptions, while, due to their volcanic origin, they possess a large number of thermal springs. The islands present mountainous terrain, but small mountain height. In the Cyclades there are small valleys and campaigns, but no lowlands. The climate in the Cyclades is determined by the Aegean Sea and characterized by mild winters and cool summers.

The Cyclades, due to their geographic location, have been, throughout their history, a strategic point regarding the trade routes' development and the culture's expansion. The islands are well-known for the Cycladic culture's development in ancient times. In the middle of the second century BC, they were brought under Roman domination and, during that period, they presented a decadent culture. During the Byzantine period, the Cyclades administratively belonged to the "Theme" of the Aegean Sea and, during that period, they were several times attacked by pirates. In the 12th century they were conquered by the Venetians and flourished. In the 16th century they were under the authority of the Turkish, from whom they were liberated and were merged into the Greek state in 1830 (Moípa, 2005, σ . 293-294).

The islands' particularities

In general, the Cyclades islands' figure is uniform, with main feature the fragmentation and a wide variety of islands of different sizes and with different characteristics. The geographical discontinuity (insularity) and the distance from the mainland and the Greece's and European Union's large markets, the inability to resolve the transport problems, as well as the islands' isolation, the small, mainly, islands' exclusion from the information and provision of services centers, the small islands' depopulation and gradual desolation (in combination with the unfavorable political happenstances in the wider area/the relationships with Turkey) form part of the islands' major problems. At this point, the particular sensitivity of the islands' ecosystems, the serious lack of water and energy resources, as well as that of social services and the reductions observed in groundwater levels, should also be mentioned. Finally, difficulties are identified in the adaptation to new management techniques and the use of new technologies, while a lack of resources, as well as an inability of rational planning, mostly due to the municipal services' concentration in large, mainly, geographical units-poles, also exist.

"Double" insularity in the sense of insufficient connections and small islands' isolation, inadequate organization of the coastal and air links, as well as the high transport costs that result in limited competition in transport links are also included in these islands' major problems. At the same time, spatial overconcentration of the touristic flow and the tourism activity, tourism seasonality and, by extension, seasonal unemployment, limited use of the cultural resources, insufficient interconnection with other economic sectors, etc. abandonment of traditional sectors, techniques, events, gastronomic habits, etc. and further encumbrance of tourist saturated areas have also been recorded (Kóv $\sigma \lambda \alpha \zeta$, 2012, $\sigma \sigma$.11-18).

For the reasons mentioned above, a closer study and record of the natural and manmade resources, as well as coordination of and, mainly, cooperation among the bodies involved are absolutely necessary.



Research Methodology

The objective of the present study was the investigation of religious tourism's developmental perspectives on the Cyclades islands. In order to conduct this study, it was necessary to record the islands' resources, with a focus on the religious-cultural resources. Initially, the local public bodies were asked to provide information and data on the islands. Due to the local authorities' disinterest, declination or/and indolence concerning the data provision, the existing religious-cultural resources were researched and recorded with the use of certain websites of: a) the region of the South Aegean, b) the municipalities of individual islands, c) religious monuments (churches, monasteries and other pilgrimages), d) the Church of Greece and, simultaneously, through research of the relevant bibliography and sources. Moreover, general data and information, regarding the existing islands' resources, their infrastructures, their transport networks, as well as their connectivity to the inland were also collected.

After the record, the religious-cultural resources were classified based on the classification of Moí $\rho\alpha$, 2009, $\sigma\sigma$. 49-61 and Moira et al., 2009, pp. 471-479. Then, an attempt was made to combine them with other alternative forms of tourism that are already being developed or could be developed on the Cyclades.

Research Results

The research showed that the Cyclades islands possess rich religious-cultural resources, which fall within different "typologies" and can be utilized either autonomously or in combination with other "resources" (Μοίρα, 2015).

Initially, there are large pilgrimage centers, like Panayia of Tinos and Panayia Ekatontapyliani of Paros, which are already developed and attract autonomous pilgrimage and religious-cultural tourist flows. These centers are relatively easily accessible (for example, Tinos with the use of shipping lines and Paros with the use of maritime and air links), but they attract visitors/pilgrims on a seasonal basis, namely during the commemoration of the Virgin Mary or the patron Saints celebration.

Likewise, there are plenty other resources, more or less known, the access to which is difficult in the absence of an air link (for example, Amorgos) or even if the latter exists, it is an unprofitable airline route (for example Paros, Syros), while the existing maritime link is also an unprofitable shipping route (for example Katapola, Eyiali, Donoussa, Koufonisi, Schoinoussa, Iraklia). These resources are underused or unused and they, consequently, require special promotion management.

Their development can be approached in two directions, namely the one of pilgrimage (to churches, monasteries and other sacred places) and the other of religious-cultural tourism, in terms of visiting religious sites as cultural sites. Furthermore, a set of activities that could be combined with religious-cultural tourism are ecotourism, marine tourism, agrotourism, oenotourism, gastronomic tourism, geotourism, fishing tourism activities, etc.In particular, the alternative forms of tourism that can be developed in the Cyclades are:

Hiking-tour, ecotourism. Due to the unique natural environment and the scenery of the Cyclades islands, hiking can be combined with visits to churches, monasteries and places of religious interest. In many cases, in the Cyclades islands, the religious monument, regardless



of its active or inactive character, is integrated into the general natural environment by which it is characterized or which the monument itself characterizes (Moí $\rho\alpha$, 2009, σ . 52; Moira et al., 2009, p. 473). As a matter of fact, the natural or the cultural element's superiority is not always distinct. However, it is certain that the natural element complements the cultural one and they both, as a whole, form the idyllic setting which, finally, attracts the tourists. For example in Sifnos, hiking/tour can be combined with ecotourism in the region of "Natura 2000" and, at the same time, the tourist may also visit churches and monasteries (for example, the Monastery of the Taxiarchi tis Skafis, the chapel of Agios Stathis, the church of Agia Marina and Agios Konstantinos at Flambouro, etc.), respectively at Milos (Panagia Tourliani, Profitis Ilias, Agia Marina etc.), while the same can happen at Andros, Tinos, Antiparos, etc.

Marine tourism. Marine tourism is one of the most dynamic forms of contemporary tourism. It includes all the recreational activities whose reference, developing field and scope is the marine environment. The marine tourism activities' framework is wide (Orams, 1999; Μυλωνόπουλος & Μοίρα, 2005). In Greece, marine tourism can cover all its forms and a variety of marine recreational activities. In the Cyclades islands there are regions in which, apart from the typical marine activities (for example swimming, sunbathing on the beach, etc.), windsurfing, diving, marine mammals' and animals' observation, sailing, fishing (fish/cultural tourism) etc. can also take place. In the case of religious tourism, many churches', monasteries' etc. spatial isolation, as well as the difficulties presented in road access, may be tackled with accessibility by sea. This measure provides the possibility to attract people, whose main incentive is to enjoy the marine environment. Hence, marine recreational activities can be combined with visits to churches and monasteries, accessible by boat only, for example at Andros, Tinos, Kea (Panagia Kastrini), Folegandros, etc.

Agrotourism, oenotourism, gastronomic tourism, fishing tourism, rural tourism. The institutional framework regarding these alternative forms of tourism was recently regulated in Greece. The study showed that different alternative forms of tourism may be combined with religious-cultural tourism. In particular:

- Agrotourism. According to the existing institutional framework, agrotourism is defined as "the special form of rural tourism, which relates to the provision of reception, hosting and catering services in places functionally unified with agricultural holdings, that are offered combined with activities related to the agricultural production, as well as the protection and promotion of the natural and the man-made agricultural landscape" 2016, $\sigma\sigma$. 384-388). In Greece, agrotourism develops certain (Μυλωνόπουλος, characteristics, defined by the rural society's nature. Sociability is one of agrotourism's characteristic features in Greece. The tourist becomes an active member of the rural society, participating in the agglomeration's social activities. He visits the coffeehouse and the tavern, enjoys the local snacks and beverage (raki, ouzo, wine, etc.), and participates in traditional holidays and feasts that take place in the village's square, the church, etc. in an effort to be integrated into the rural settlement's social fabric. The social interaction element is the one that defines Greek agrotourism's special identity and can become its comparative advantage (Μοίρα, 2004).

- Oenotourism. The term oenotourism or wine tourism is used to describe the visit to vineyards, wineries, exhibitions and wine festivals. The visitors' major incentive is winetasting and the exploration of a wine-growing area's characteristics. Oenotourism refers to visits to vineyards, wineries and, in general, to wine production facilities, where the tourists



may taste wines or even take part in the grape harvest. The study shows that a connection between religious-cultural elements and elements of wine is possible through visits to small monastery wineries, for example, the Zoodochos Pigi Monastery winery, the Logovarda Monastery winery on Paros and, in general, through visits to small vineyards and wineries (for example, Tinos, Syros, Naxos) or traditional drinks' distilleries (for example, Citron in Naxos, Tsikoudia in Ios, Baked raki in Amorgos, etc.).

- *Gastronomic tourism*. The role played by the food in relation to a tourist destination's "image" has, over the last few years, started to distract the attention of researchers, the scientific community, tourism professionals, food industries, local authorities and governments. Gastronomy is supposed to be an important cultural activity, which is itself particularly attractive for the visitors, but, at the same time, it is a valuable complement to the cultural products' traditional portfolio, in which other elements like the monuments, the museums, the local architecture, etc. are also included (Moira et al, 2015, p. 138). According to the International Culinary Tourism Association (2009), gastronomic tourism is "the intent of a unique and memorable food and beverage experience... Eating local food and drinking local wines gives the impression of the participation in a really different culture... The place's natural beauty, the environment's authenticity, as well as the food presentation are gastronomic tourism's essential characteristics".

Within this framework, the intense interest in the monastic diet, which combines various tastes and contributes to human health, should also be mentioned. For example, in recent years, the Mount Athos monastic cooking is being highlighted (see Epiphanios, 2012). The information given above is being widely used by the tourism industry, in order to develop relative products, like educational cooking lessons combined with sightseeing tours and organized accommodation in farms, where the visitors reside in the farmer's house and, at the same time, they can help in the agricultural work and participate in the food production and, of course, in its consumption, having gained the experience of "rural tourism", by participating in gastronomy or agrotourism, festivals [for example, Artichoke Festival, Raki Festival (at Falatado) and Honey Festival (at Kampos)], etc. In the case of the Cyclades, the development and promotion of a new tourism product in which religious-cultural tourism will be combined with local gastronomy is possible. In particular, in some islands, it is possible to utilize events on religious holidays-feasts and the offer of local dishes in order to create each island's "religious-gastronomic identity". Some examples are (Greek Gastronomy Guide, 2016) the traditional patatato at Donoussa, the xidato at Amorgos (Eyiali), the revithada at Sifnos, etc.

- *Fishing tourism*. Fishing tourism aims, on one hand, at the public entertainment through fishing and the contact with its specific characteristics and, on the other hand, at the fishermen's financial support and the stimulation of the social fabric's local communities. It refers to tourism that takes place in the marine environment and includes fishing activities development by professional fishermen, aiming at the tourists' entertainment and the fishing culture transmission. This tourism is both cultural (contact with fishermen culture) and ecological, as it complies with the sustainability principles. In the Cyclades there are a large number of fishermen who could, through this activity, attract tourists and, also, complement their income.

- *Rural tourism*. The term rural tourism describes every form of organized and sustainable tourism development, aiming at the visitor's contact with the nature and the rural

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activities. It supports the countryside financially and socially, without distorting the environment and each place's specific cultural characteristics.

- Architectural-Religious-Cultural tourism. The considerable interest observed in the architectural specialty of the Cyclades' churches and monasteries, may affect specific populations, with an interest in the place's culture, focused on church architecture. Already, the term "architectural-cultural tourism" is being mentioned (Ockman and Fausto, 2005; Specht, 2014). This term is used in order to describe sight-seeing aiming at making contact with the area's architectural (accordingly and cultural) heritage. The architectural-cultural heritage's wealth and diversity become apparent in traditional agglomerations, historic buildings, castles and fortresses of the Roman, the Venetian, the Byzantine and the Ottoman period, historic lighthouses, as well as in monuments of the modern history (public buildings, eminent persons' residences, towns' central squares, etc.) of great historical and with great architecture value (Alter Tourism, 2011). Of course, within the buildings mentioned above, churches and monasteries (religious monuments) are also found. In the case of the Cyclades, these monuments are characterized by their particular architecture, which is specific on each island (for example, Paros, Thira, Ios, Naxos, Amorgos, Mykonos, etc.) and may attract tourists/visitors with a special interest in the *religious architecture*.

Geotourism. The term geotourism is used to describe the tourism activity that relates to the place's geology, geomorphology, its natural resources, the geoforms, the fossils, the rocks and the minerals, with a focus on the estimation of the procedures that have created and still create these particular geological formations (Buckley, 2003; Mylonopoulos and Moira, 2015, p. 78). Geotourism is often mentioned as a form of nature tourism, mainly focused on the geosystem. According to the National Geographic (2005), geotourism is the form of tourism that preserves or reinforces a place's geographical character, environment, culture, aesthetics, heritage and the residents' affluence. Geotourism helps travelers increase their knowledge on the natural resources, the reception society's cultural identity and its administrative method (Mv $\lambda \omega v \delta \pi \omega \omega \zeta \kappa \alpha Moi \rho \alpha, 2014, \sigma \sigma. 201-202$). Geotourism can be developed in some of the Cyclades islands (for example, Milos, Santorini) either individually (for example, caves related to the religious tradition, like the Cave of Agios Ioannis on Iraklia) or in combination with religious-cultural tourism (for example, the Black Cave on Sikinos, which is located under the Chrisopigi Monastery).



Figure 1. The nexus of religious-cultural tourism and alternative forms of tourism in the Cyclades



All the alternative forms of tourism mentioned above could be effectively supported through the islands' integration into the "slow tourism" network. The concept of "slow tourism" is not new, although in Greece it has not gained followers yet. "Slow tourism" suggests a new tendency in tourism. This tendency has, in real terms, emerged from the wider tendency of "slow movement" that was generated based on the "slow food" philosophy (Hall, 2006). This new way of tourism is based on the independent exploration, on behalf of the tourist, in a sustainable way (Avgerinou-Kolonia and Toufengopoulou, 2012). In fact, it illustrates a change from mass package tourism to more authentic trips. Nowadays, the main trends in tourism relate to the experience gaining in ways friendly to the environment. Slow tourism covers the sustainability prerequisites, travelling slowly, a situation more meaningful for the tourist, while it also offers interaction with the natives and knowledge of the local culture. Of course, an important dialogue is being developed, in relation to the "slow tourism's" conceptual definition, the ways of measuring it, as well as its classification. However, no one questions the finding that it refers to a new tendency that contradicts the dominant, until now, tendency of mass or fast tourism (Moípa, 2017). One of the "slow tourism's" determinants is the chance given to the traveler to form part of the local life and to connect to the places visited and the people who live in them. The term "slow tourism" describes the tourist's direct communication with the local culture. In fact, the concept of "slow tourism" integrates and combines activities of all the special and alternative forms of tourism, like cultural (religious-cultural, architectural-cultural, industrial-cultural, marine, marine-cultural, agrotourism, fishing tourism, ecotourism, sports tourism, etc.). Hence, the travelers stay in a place for at least a week. Nowadays, there is a network of slow cities. The municipalities' that participate in the network main philosophy is that of "time recovery", the travel during which human beings keep the leading role, the human health protection, the products' authenticity and the high quality food, as well as the enjoyment of the rich traditions, the valuable art objects, the places, the stores, the intellectual places and the virgin landscapes. Furthermore, it is characterized by spontaneous religious rituals and events and the tradition's respectfulness, through the enjoyment of a slow and quite way of life. From Greece, no place or municipality participates in the network of slow cities, yet. Due to the Cycladic islands' geographical and geomorphological specificities, their integration into the network of the slow cities is viewed as an excellent choice. This integration will allow their promotion and their introduction to a special population of tourists, characterized by cultural interests (Moípa, 2015).

The islands' tourism promotion

The Cycladic islands' specificities, as these emerged from the study, many islands' geographical isolation, the insufficient maritime and air transport systems, as well as scarcities in infrastructures, make the management of the islands' development as a whole a necessity. Within the framework of their effective promotion as a touristic area, the implication of the concept of the "gate" might prove to be useful. The term "gate" is used to describe an already established tourist destination (like, for example, a capital, an important pilgrimage, a natural beauty landscape or a well-known holiday resort), which can be utilized in order to increase the broader area's touristic traffic (for example, the role of the "gate" could be played by Paros, Mykonos, Santorini, Tinos and other islands). This could be achieved through a combined tour package, which will include, for example, three days at the main destination (gate) and two days at a nearby island with religious- cultural interest. Thus, the tourists visiting the known tourist destination (gate) will be encouraged by the local, private and public bodies to expand their tourist experience by visiting religious-cultural monuments of the broader area. In the case that the regional unit decides to use the concept of the gate, then it must coordinate all the islands that present religious-cultural or pilgrimage



interest and define, after taking into consideration the geographical and transport limitations, the island that will operate as a "gate" or the islands that will operate as "gates" for the Cyclades. Additionally, the "gate" establishment will encourage the area's tourism entrepreneurship, since tourists' transportation will be facilitated by ferry boats, which will connect the "gate" to the islands around it. For example, using Paros as an entry "gate" (Ekatontapiliani), small escapes to Antiparos, Naxos, Ios and Sikinos can be scheduled.

Suggestions

In summary, the Cyclades possess, as a destination, important religious-cultural resources, which could attract visitors-tourists, either as self-reliantly religious-cultural tourist destination or as a complement to other forms of alternative tourism, if used properly. The alternative forms of tourism can be developed either in combination or complementary to each other, in an effort to elongate the tourist season, to redistribute the tourist flow and to emphasize and reinforce the "local" character. Furthermore, the islands' integration into the network of slow cities is also recommended, since slow tourism matches the islands' figure and their need to elongate the tourist season and to help grow the less developed or not developed at all areas, as well as to operate the "gate" or "gates", through which the visitors will be channeled to touristic developing or not developed areas of the same or other nearby islands with religious-cultural interest. This study has also shown that many islands with religiousOcultural wealth, which is not a self-reliant attracting pole, can reinforce their tourism product with the use of their religious-cultural resources. For example, by offering "tourist packages" in which visiting religious-cultural resources will be a complementary tourist activity. Hence, religious-cultural tourism may be a complementary tourist activity to hiking-tour, ecotourism, architectural tourism, marine tourism, etc.

Additionally, for the development of religious-cultural tourism in the Cyclades, either self-reliantly or as a complement to other alternative forms of tourist activity, the utilization of new technologies in order to advertise and promote the islands and, in particular, their religious-cultural resources, to promote and reinforce the tourism entrepreneurship by creating a shipping line network aiming at the effective interconnection among the islands and their accessibility, the investigation of the possibility to use seaplanes in order to transport the tourists among the islands, the implementation of training programs for both the entrepreneurs and the people occupied in the religious-cultural tourism's area is absolutely necessary. Furthermore, a prerequisite is the promotion of the cooperation between public and private bodies, regarding the islands' religious-cultural resources' promotion and utilization.

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The Athens Authentic Marathon as a tourism event

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Abstract

Sport, like tourism, is being viewed as one of the most large-scale social phenomena. Both activities are supposed to be important "industries", since they attract a large number of people at a constantly high pace. Recently, the interest of the sport and the tourism industry, as well as of the scientific community in sport as a tourism product has substantially increased. As a matter of fact, the scientific community has recognized the latter as an area of special academic interest. Hence, the so-called "sport tourism" emerges as a tourism activity.

The "Authentic" Marathon, organized in Athens on an annual basis, and is one of the biggest sport events. In parallel with the Marathon, other foot races (5Km and 10Km, Special Olympics, dynamic gait and children's races) are also being held. The organization's object is to contribute to the development of the running movement through the promotion of another lifestyle and to involve both residents and tourists who have integrated exercise and running into their daily activities. At the same time, another object is the organization's establishment as a world tourism-sport event, with the participation of runners and visitors from all over the world. Finally, the promotion of Athens at international level is also important.

The present quantitative research was held in order to investigate the incentives of the participants in the Athens Marathon, as well as the extent to which the latter were satisfied by the races' organization. For the purpose of the study a structured questionnaire of 17 questions was distributed during the races, in November 2016.

The findings of the study show that, despite the competent bodies' efforts, the Athens Marathon has not been established in the tourists' consciousness, since it does not attract a large number of foreign participants in the races.

Keywords: Sport tourism, the Marathon, Athens **Main Conference Topic:** Sport tourism

Introduction

Tourism is a multi-dimensional social-economic phenomenon which, from antiquity to the present day has always been and still is related to the leisure time. Tourists spend their leisure time traveling away from their place of residence and work, so that they will be able to experience the change. The reasons why a person decides to travel vary, according to the incentives and the purpose, for example, leisure, recreation, sport, etc.

According to Edwards (1973), the concept of "sport" has its roots in "disport", which means to distract or to divert and refers to the overriding importance of sport as an activity that distracts the individuals' attention from the everyday austerity and its pressures.



Of course, this concept has nowadays changed. Sport can be considered from many different points of view and perspectives. So, sport is viewed as a game (Hart and Birell, 1981) or a diversion from the daily routine, as leisure or recreation, as a pleasant way to spend time in open areas, for example, hunting, fishing, skiing or hiking (Zeigler, 1984).

Nowadays, sport, just like tourism, is supposed to be one of the most large-scale social phenomena. At the same time, both activities are considered important "industries", since they both attract large groups of people at a constantly high pace. Lately, the interest of the sport and the tourism industry, as well as of the scientific community in sport as a tourism product has substantially increased. As a matter of fact, the scientific community has recognized the latter as an area of special academic interest (Standeven & De Knop, 1999). Thus, the so-called "sport tourism" emerges as a tourism activity.

Tourism and sport

Based on the information presented in the previous section, Olivova (1984) considers that the points that these two activities share in common are increasing rapidly. As a matter of fact, the term "sport tourism" has been invented in order to easily understand the use of sport as a tourism phenomenon. Pigeassou (2004:287) mentions that the so-called "sport tourism" is a social and economic activity located between sport and tourism.

A large number of philosophical, entrepreneurial, communication, as well as social developments have contributed to the engagement between sport and tourism. These developments are focused on the following:

a) "Sport tourism" presents increased popularity, since it has been based on, promoted through and is well-documented by big sport events of global dimension (Blatiz, 1991, In Kurtzman, 2001:104), like the Olympic Games, the World Championships, the Marathons and other, similar events.

b) "Sport tourism" is a mass event, supported by the promotion (through the media) of the worship of the "athletes-heroes" and their "stalwarts" (Kurtzman *et al.*, 1993)

c) In the western societies health promotion through physical activity for people of all ages, has renewed the interest in the participation in a large variety of sport events (Bhatiz, 1991; Pigeassou, 1997:26) and, subsequently, an important increase in the organized offer of sport events is observed at the global level.

d) Gradually, the importance of both sport and tourism in the promotion of the local, national and international friendship, as well as of the understanding among individuals, groups and communities, is being understood (Kurtzman *et al.* 1993).

Technological developments contribute to the development of sport tourism (Gammon & Robinson, 1997), as well as the development of the means of transport, since the latter allow the athletes' and spectators' transport.

Sport tourism could be classified into two large categories based on the active participation or not in the sport activities. Specifically, there is a distinction between the sport events' spectators and the active participants in a sport organization. These distinctions have occasionally been subjected to intensive academic dialogue (De Knop, 1990; Hall, 1992; Nogawa, Yamguchi & Hagi, 1996; Green, Chalip and Verden, 1998; Gibson, 1998).

Another distinction could be made based on whether the participant is a sport professional or not. In this case, a big issue rises about whether a sport professional may be



considered a tourist, since the transport lacks basic tourism elements, like the incentive, which is the recreation, the free choice and free time (Mulauvó π ouloc, 2011:5).

Gibson (1994) made an attempt to categorize sport tourism based on the activities carried out during these types of tourists' vacations. Specifically, she suggests the following sport tourism categories:

a) *Sport and exercise tourism*, which refers to tourists who want to combine exercise with sport during their vacations. Such examples are the tourists who visit destinations that allow them to combine their vacations with sport activities, like swimming, sailing, climbing, etc. As a matter of fact, it should be stressed that, for many tourists of this category, the participation in a sport event might be of greater importance in comparison to the destination that hosts the event.

b) *Sport events tourism,* when the tourists choose destinations that also provide sport services. In this case, the sport events (like the Olympic Games, the Football World Cup, the Marathons, etc.) are the basic incentive regarding the growth of tourist flows to certain destinations.

c) *Cultural sport tourism*. This is a type of activity expressed through the visitors' interest to be in sport places of great historic importance and cultural interest, in places that host popular sports, in well-known emporia selling sports equipment or to meet famous sports personalities ($\Gamma\kappa\iota\delta\sigma\sigma\varsigma$ *et al.*, 2000:83). Into this category the archaeological site of Ancient Olympia, large stadiums having hosted the Olympic Games, various football fields, etc. are integrated.

Kurtzman and Zauhar (1997) have made an attempt to solve the definition problems of sport tourism through five basic products, namely the sport tourism attractions, the sport tourism cruises, the sport tourism resorts, the sport tourism tours and the sport tourism events.

Gibson (1998) divides sport tourism into the following three large categories: the attendance of a sport event, the visit to a sport location and the active participation in a sport event.

Gammon & Robinson (1997) mention two distinctions, "sport tourism" and "tourism athletics". As long as it concerns "sport tourism", the transport's main incentive is the sport activity, while the tourism element just reinforces the total experience. On the contrary, "tourism athletics" refers to individuals who either attend or, occasionally, participate in a competitive sport event. In this case, the travel is the transport's main incentive, while sport functions as the transport's secondary incentive.

According to $\Gamma \kappa i \delta \sigma \varsigma \ et \ al.$ (2000:82) sport tourists are divided into two subcategories, the one of the spectators and the other of the participants (athletes, organizers, etc.). The two subcategories' individuals substantially differ in their consumer characteristics and the length of stay at their destination.

Greece and sport

Greece has been the cradle of civilization and sport. Gardiner (1930:1) supports the thesis that "the history of the athletics in the ancient world is the history of the athletics in ancient Greece, due to the fact that the Greek nation was the only athletic nation in the ancient world". Since antiquity, various games had been organized in Greece, in order to honor the gods, like, for example, the Panathenaic games, which were organized every four



years in order to honor goddess Athena¹, the Isthmian games, which were organized in order to honor god Poseidon², the Pythian games, which were organized in order to honor god Apollo³, the Heraia festival, which was organized in order to honor goddess Hera⁴, the Asclepieia festival, which was organized in order to honor Asclepius⁵, the Nemean games, which were organized in order to honor god Zeus. The games and festivals included athletic, as well as poetry, music, drama and other contests.

However, the oldest and most important of all the games were the Olympic Games, which were held every four years at Olympia in honor of Zeus, the father of all gods. Pausanias mentions that "... Hercules..., matched his brothers in a running race and crowned the winner with a branch of wild olive. Thus, on this occasion, Hercules has the reputation of being the first to have held the games and to have called them Olympic" ($\Pi \alpha \upsilon \sigma \alpha \nu (\alpha \zeta, V, 7.7-9)$).

The games were held at the Stadium and the Hippodrome, in front of thousands of spectators from all over the known ancient Greek world. The winners' award was a branch of wild olive, called laurel, while the winners were honored by their home countries. Finally, during the games, ceasefire was taking effect.

The Athens Marathon Implementation

The Marathon route (42,195m) is one of the most important races in the modern Olympic Games. It was integrated into the Olympic program in 1896, after Michel Breal, a Sorbonne professor and friend of the French baron Pierre de Coubertin, had suggested it. Pierre de Coubertin was the founder of the International Olympic Committee and is regarded as the modern Olympic Games' reviver and father. The race was established in memory of

¹ The games' foundation is being attributed to Erichthonius of Athens or to Theseus. Their reorganization is being attributed to an initiative of Peisistratus, during the decade between 570-560 B.C. During the archaic and the classic period, the fame of the Panathenaic Games was similar to the one of other popular Panhellenic games (the Olympian games, the Pythian games, the Nemean games and the Isthmian games). During the classic period, the Panathenaic games were held in the second half of August, their duration was eight days and they included music, rhapsode and athletic contests, equestrian competitions and other events (Τδρυμα Μείζονος Ελληνισμού/I.M.E. [Foundation of the Hellenic World], 2016α).

² The games were held in Isthmia every two years and their duration was three days. In the first half of the 6th century B.C. the Corinthians added naked and equestrian competitions. The games were held during the Roman period, under the control of Corinth. An exception was made during the period between 146-144 B.C. At that time, the Corinth had lost its political rights and the games' responsibility was taken over by Sikyon (IM.E. [The Foundation of the Hellenic World], 2016 β).

³ The Pythian Games were held every four years in the sanctuary of Apollo at Delphi, in order to honor god Apollo's victory against the dragon Python. The first games were music contests. Around 582 B.C. after the First Holy War naked (stadium, diaulos, dolichos, wrestling, boxing, pankration, pentathlon, herald and trumpet), as well as equestrian competitions (quadriga, chariot racing and the respective competitions in which foals were used) were also added (I.M.E. [Foundation of the Hellenic World], 2016γ).

⁴ The festival was held in the sanctuary of Hera in Prosymna, Mycenae, and eight Kilometers northeast of Argos. The Heraia festival had been held since the Greek Dark Ages-the Archaic Period, initially every three and, later, every five years. The competitions were naked (running, stadium, hoplite, dolichos, pentathlon) and equestrian, while music and drama competitions were also included (I.M.E. [Foundation of the Hellenic World], 2016δ).

⁵ The festival was held in Epidaurus, in the sanctuary of Asclepius, since the beginning of the 5th century B.C. and every four years. During the Roman times, they were called the large Asclepieia, in order to be distinguished from the Apollonian Games, another large festival held at the same time. The games included naked foot races (stadium, diaulos, hippios or four stades, hoplitodromia) and long jump, discus throw, javelin throw, boxing and pankration races, as well as equestrian competitions and chariot races (I.M.E. [Foundation of the Hellenic World], 2016ϵ).

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the heroic accomplishment of the hemerodromos-herald⁶ who had brought the Athenians the news regarding their victory against the Persians (490 B.C.).

The participation in the Marathon is, probably, the most important challenge that runners face. As a matter of fact, Marathon attracts the most participants from all over the world. For a large number of people, the participation in a Marathon is a life goal, even if it is going to happen once and regardless of the time needed to complete the course. Marathon, apart from being a major sport event, is also an important social event for the host city, since thousands of people; both athletes and spectators visit the area in order to watch the competition. The benefits of the major sport event's organization for the host country include the attraction of high income tourists and the creation of a permanent tourism clientele. At the same time, high revenues from the transportation, the accommodation, the nutrition, the athletes' workout, the buys, the museum visits, etc. are being recorded.

Marathons are being organized all over the world. The biggest are those of New York (in 2016 51,264 persons passed the finish line), Chicago, Paris, London and Berlin (HPRC, 2016). For example, it should be mentioned that 712 Marathons were organized in the USA and 59 in Canada during 2016 (Marathon Statistics, 2016).

Of course, the top Marathon is the "classic" or "Authentic" Marathon, which is being held every November in Athens. The athletes follow the classic route, which starts from the area of Marathon and ends at the Kallimarmaro Stadium of Athens. The whole distance is 42.195Km. Since 1972 the Athens Authentic Marathon is being held under the auspices of the Greek National Tourism Organization and the Hellenic Athletics Federation. It took its current form in 1983 and its numbering began then. It is included in the Gold Marathons of the International Association of Athletics Federations⁷ (IAAF).

At the same time, apart from the Marathon, 5Km and 10Km races, children's races, dynamic gait and a 1,200m race within the framework of the Special Olympics are also being organized.

The number of the athletes who participate in the races that accompany the Athens Authentic Marathon is constantly increasing (Table 1). In general, in the 2016 races, there were 50,000 registration⁸ forms regarding all the sports

	2016	2015	2014	2013	2012	2011	2010	2009
5Km	6,839	6,615	6,514	5,832	4,712	3,207	2,528	1,634
(morning)								

Table 1. Runners in the Athens Classic Marathon races 2009-2016

 $^{^{6}}$ In ancient Greece the postal system was not organized, while the road network was also problematic. The messages related to the war were undertaken by the hemerodromes or heralds, who were very quickly covering long distances using arduous roads, armed and fully equipped (Γιαννάκης, 2016). Indicatively, it is mentioned that in 668 B.C., while the 28th Olympic Games were held, the Olympic ceasefire was violated by hostilities between the Ileians and the Dymaians. After the Dymaians' defeat, an armed Ileian hemerodrome left the battlefield and, after covering 80 Klm, brought the victory message to the stadium of Olympia in the day of the "feats" (namely, the awards).

⁷ Κλασικός Μαραθώνιος Αθηνών: Ο δρόμος της δόξας! [The Athens Classic Marathon: The road of glory!] In <u>http://www.visitmarathon.gr/index.php/el/marathon-race/klasikos-marathonios-athinon</u>

⁸ The number of the participants differs from the one of the registered.

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10Km	7,732	7,180	7,149	6,497	6,014	3,761	3,266	1,900
5Km	4,023	2,589	-	-	-	-	-	
(evening)								
Marathon	13,764	11,886	10,480	8,500	6,470	6,144	10,371	3,855

Source: Athens Authentic Marathon (2016). Editing-Representation: The authors

According to the studies held by the Marketing Agency of the Hellenic Association of Amateur Athletes, the contenders are accompanied by a mean of 1.50 persons. The athletes and their attendants stay in Greece for a mean of 5 days and they spend on subsistence, nutrition, buys, museum visits, etc. a mean of EURO 1,500 (the sum refers to 2.50 persons). According to the calculations made, the revenues for Athens amount to EURO 11 million (Παπαποστόλου, 2015).

The Marathon becomes popular through the operation of websites, by its promotion through the social networks, television and radio, as well as with the use of posters and leaflets⁹.

The research

The present study was held in order to identify the athletes' incentives regarding their participation in the Athens Marathon and the races that accompany it. Another objective was the investigation of the athletes' degree of satisfaction regarding the races' organization. Within this study, a structured questionnaire of 17 questions was distributed to a random sample, during the races' day, which was the 13th of November, 2016, from 08.00 to 20.00. At that day, 200 questionnaires were distributed and 117 of them were answered. The questionnaires were written in both Greek and English.

Of the 117 participants who had answered the questionnaires, 72 were women (61.50% of the people asked) and 45 were men (38.50%). Furthermore, 12 of the people asked (10.30%) were aged between 12 and 18 years old, 43 (36.80%) were aged between 19 and 30 years old, 29 (24.80%) were aged between 31 and 40 years old, 22 (18.80%) were aged between 41 and 50 years old, 7 (5.90%) were aged between 51 and 60 years old, 3 (2.60%) were aged between 61 and 70 years old and one person (0.80%) was older than 70 years old.

As long as it concerns the participants' occupation, the results are the following. Fifteen of them (12.80%) were civil servants, 43 (36.80%) were employed in the private sector, 16 (13.70%) were self-employed, 15 (12.80%) were unemployed, 3 (2.60%) were pensioners, 8 (6.80%) were housewives, 14 (11.90%) were pupils/students and, finally, 3 of them (2.60%) mentioned that they were occupied with something else, without being more specific.

Regarding the participants' level of education, the findings were the following. Of the 117 participants, 63 (53.80%) were tertiary graduates, 4 (3.40%) had completed compulsory education, 27 (23.10%) were secondary graduates, while 23 (19.70%) held a Master Degree or a PhD.

⁹ Μαραθώνιος Αθήνας [The Athens Marathon] (2016). In <u>http://www.athensauthenticmarathon.gr/site/index.php/el/news-gr/media-archives-gr</u>



Regarding the participants' origin, 92 (78.60%) of them had Greek nationality. The rest of them (25 participants, 21.40%) indicated various countries as place of origin, like the Netherlands, Denmark, the United Kingdom, Poland, etc.

The largest percentage of the participants (74.40%, 87 persons) indicated Athens as their place of residence, while 25.60% of them (30 participants) indicated various Greek or foreign cities.

The findings clearly indicate that, despite the effort made, the Athens Marathon has not managed to attract participants coming from other cities of Greece or coming from abroad. However, of these 30 participants, 46.70% stated that they stayed at a hotel, 33.30% of them answered that they were hosted by relatives, while 20.00% of them stated that they were hosted by friends.

When the participants were asked whether they were accompanied to the races by other persons, 32.50% of them (38 persons) answered that they were accompanied by friends, 24.80% of them (29 persons) answered that they were accompanied by their spouse/partner, 14.50% of them (17 persons) answered that they were alone, 10.30% of them (12 persons) answered that they were accompanied by family members, 6.00% of them (7 persons) answered that they were accompanied by other members of their sports club, 4.30% of them (5 persons) answered that they were accompanied by relatives, 4.30% of them were accompanied by another person, while 3.30% of them (4 persons) answered that they had come with their children.

Regarding the ways that the participants were informed about the races, of the 117 participants, 35.00% (41 persons) mentioned that they were informed through the internet, 25.60% (31 persons) were informed by relatives and friends, 17.10% (20 persons) were informed by the sports club they belonged to, 12.00% (14 persons) were informed by other sources and only 9.40% (11 persons) were informed through other means of promotion.

As long as it concerns the running routes, of the 117 participants, 48.70% (57 persons) participated in the morning 5Km race, 26.50% (31 persons) participated in the 10Km race, 19.70% (23 persons) participated in the Marathon race, 2.60% (3 persons) participated in the evening 5Km race and 2.50% (3 persons) participated in the dynamic gait.

When the participants were asked about their incentives regarding their participation in the races, of the 117 persons, 70.90% (83 participants) answered it was the experience, 35.90% (65 participants) said it was their personal satisfaction, while 14.50% (17 participants) answered it was the classic route's glow that had initially attracted them. Only 1.70% of the participants answered "for the medal" and 3.40% of them answered that it was the competition.

Of the 117 participants, 45.30% (53 persons) said that, in the past, they had participated again in similar races. This finding certainly indicates a systematic engagement in sport.

The answers given to the questions regarding the degree of satisfaction obtained from the organization and the other events were as follows:

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	/ery satisfied		Very satisfied Satisfied			Neither satisfied nor dissatisfied		Dissatisfied		Very dissatisfied		Prefer not	to answer
	Р	%	Р	%	Р	%	Р	%	Р	%	Р	%	
Organization	49	41.90	31	26.50	18	15.40	11	9.40	8	6.80	0	0	
Accessibility	56	47.90	28	24.00	21	18.00	4	3.40	7	6.00	1	0.70	
Pasta Party	34	29.00	17	14.50	20	17.10	9	7.70	4	3.40	33	28.30	
Events	30	25.60	32	27.30	23	19.80	18	15.40	8	6.80	6	5.10	
Information about the races	50	42.70	29	24.80	18	15.40	10	8.60	9	7.70	1	0.80	
Information about Athens	38	32.50	20	17.10	25	21.30	14	12.00	12	10.30	8	6.80	
Hospitality	52	44.50	26	22.20	15	12.80	6	5.10	8	6.80	10	8.60	
Cultural attractions	57	48.70	20	17.10	12	10.30	13	11.10	11	9.40	4	3.40	

Table 2. Degree of satisfaction obtained from the participation in the Athens Classic Marathon

It should be noted that the respondents appeared very satisfied by the organization (41.90%), the accessibility of the races' area (47.90%), the way they were informed about the races (42.70%), the information provided about Athens (32.50%), the hospitality (44.50%) and the cultural attractions (48.70%). Furthermore, 27.30% of them said that they were satisfied and 25.60% of them said that they were very satisfied by the events that took place in order to accompany the races. Finally, 83.70% of the participants (98 persons) stated that they intended to participate again in the Athens Marathon.

Conclusion

The study shows that 70.90% of the participants in the races stated that their major incentive was the experience gained, 35.90% of them mentioned their personal satisfaction, while only 14.50% of them were motivated by the desire to participate in the classic route.

Furthermore, the findings of the study show that, despite the competent bodies' efforts, Athens, even though it is the Marathon's city of origin, has not been established in the tourists' consciousness and does not attract a large number of foreign participants in the races.

Furthermore, lack of information is also indicated, since only 35.00% of the participants were informed about the Marathon through the internet, while 26.50% of them were informed by relatives and friends. Finally, the contribution of television and other means of promotion is only 9.40%.

The positive note is the fact that most of the participants appeared very satisfied by the organization, the accessibility, the information given, the hospitality and the Athens attractions. This positive evaluation can be utilized in order to establish the Athens Marathon as a sport tourism event that attracts many participants.

Further research is needed in order to investigate the extent to which the athletes are informed through the media. Additionally, further research is needed so that the incentives of the races' athletes, mainly of the foreign visitors, will be identified, in order to be able to

approach these groups and to design appropriate tourist packages for the successful promotion of athletic events in the future.

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Perspectives and Perceptions of Prague: The Touristification of a City

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Abstract

This paper explores the ways in which urban tourism is situated as a visual experience in the context of Prague's historic monuments and architecture. Sightseeing serves to construct social and personal worlds in the sense of literally guiding the tourist to what should be viewed and how these are then translated in experiences of place. This kind of perceptual-cognitivism is a cultural commonplace, actively maintained in the accomplishment of a range of social practices, including those associated with tourism such as travel guides. The notion of tourist sites as sights is therefore actively constructed and comes to define the nature of what counts as the leisure activity of tourism. Such sites might include monuments, architecture or religious sites. Some may be considered as must-see whilst others characterized in terms of a more leisurely or wider interest. This activity and social practice preserves an ideology of tourism as the journeying of psychological individuals seeking to add to their experience. It is argued this maintains an economy of tourism rooted in the psychological discourse of perception and this is in turn related to examples of Prague's touristification.

Keywords: Prague, tourism, touristification, sightseeing **Main Conference Topic:** Tourism

Introduction

Urban tourism has been defined as "one among many social and economic forces in the urban environment. It encompasses an industry that manages and markets a variety of products and experiences to people who have a wide range of motivation, preferences and cultural perspectives and are involved in a dialectic engagement with the host community" (Edwards, Griffin, and Hayllar 2008: 1038). Capital cities play a significant role in tourism, attracting a large amount of visitors for business purposes, such as conferences and meetings, as well as those who come for leisure activities in terms of a city break (Ashworth & Page, 2011). The expansion of urban tourism has been aided through developments in transport and information technologies (Dunne, Flanagan, & Buckley, 2011). For example, low-cost airlines have enabled relatively fast and cheap connection between city destinations while the expansion of the Internet booking systems has facilitated searching for information about destinations and booking tours and accommodation.

Urban tourists in cities such as Prague consume a range of experiences, mainly in terms of sightseeing but also cultural events, shopping and dining. Cities compete on the global market for tourists by marketing themselves in certain ways and by developing or enhancing their attractions and their urban surroundings. In tourist-historic cities (Ashworth & Turnbridge, 1990) such as Prague, the majority of attractions are set within historical urban



layouts typically involving notable architecture and monuments. Thus, the 'Royal Way' has become associated with a tourist route through the historical core following the processional route taken by the kings and queens of Bohemia at their coronation (Fig. 1). This route begins at the Powder Tower (Prašná brána) and continues through the Old town Square (Staroměstské náměstí) and then towards the Lesser Town (Malá Strana) crossing over the Charles bridge (Karlův most), and onward, ending at Prague Castle (Pražský hrad). This has has become the major tourist artery from one side of the river Vltava the other (Dumbrovská, 2017; Dumbrovská and Fialová, 2014; Kádár, 2013) and along the way provides the tourist with journey through Gothic, Renaissance, Baroque, Classicist, Art Nouveau and Cubist architectural buildings.



Figure 1: The Royal Way (Google Maps, 2017)

There is a strong concentration of tourist along the various points of interest along the Royal Way, which are typically referred to in the literature as "tourist enclaves" (Judd, 2003), "tourism business districts" (Getz, 1993), "tourist districts" (Pearce, 2001) or "urban tourism precincts" (Hayllay, Griffin, & Edwards, 2008). Hayllar and Griffin (2005: 517) characterize a tourism precinct as "a distinctive geographic area within a larger urban area, characterized by a concentration of tourist-related land uses, activities and visitation, with fairly definable boundaries". These areas typically offer a higher concentration of tourist facilities such as monuments, museums, restaurants, hotels, information centres and souvenir shops.

Although the Royal Way is the most crowded tourist thoroughfare, a second tourist travel axis (Fig. 2) consists of two corridors that lead off opposite ends of the old Town Square. Paris Avenue (Pařížská třída) offers an upmarket shopping boulevard while Wenceslas Square (Václavské náměstí) provides more high street offerings as well as being interspersed with numerous hotels, restaurants and bars (Fig 3). Visually, they offer the tourist fine examples of neo-Baroque and Art Nouveau architectural styles. A third tourist axis (Fig. 2) consists of the embankments of the river Vltava along which are a variety of important buildings such as theatres, concert halls and museums. In addition to walks along the embankment, river cruises provide a means of viewing these various ornate and historic buildings from a vantage point that permits their full appreciation, as well as offering a tourist experience in itself in terms of a river journey (Fig. 4).

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Figure 2: Two Further Tourist Axial Routes (Transposed on Google Maps 2017)



Figure 3: Wenceslas Square (Author Photograph)

Figure 4: River Vltava View (Author Photograph)

Each of these tourist axial routes offers not only a variety of touristic experiences but also involves sightseeing as a perspective on the historic nature of the city. From a tourist perspective, Prague is a veritable visual feast. This corresponds well with the one of the defining aspects of tourism in terms of capturing images of what has been seen. The visual nature of tourism is located within an inner/outer dualism with respect to a mind that tries to apprehend, grasp, understand or make sense of sites that are visited. This kind of perceptualcognitivism is a cultural commonplace, actively maintained in the accomplishment of a range of social practices, including the construction of tourism as that of visual encounter. Urban tourism has been accompanied by a burgeoning popular tourist literature in the form of various guides, brochures and websites that contain a wealth of information about sightseeing. These commonly provide the prospective tourist with images that can be seen on-site



in tourist destinations. Within this literature is and over-arching ideology of tourism as primarily a psychological or mental experience rooted in seeing. The urban tourist travels to be historic cities, such as Prague, to see a different place and to gain some sort of beneficial personal 'experience' from having seen. This is often framed in terms the temporal nature of the tourist's stay, usually framed within the short-stay city break.

Popular urban tourist literature therefore conveys a sense of how other places can be experienced, understood, and seen. In this context, tourism is often framed in terms of seeing sites through which personal enjoyment is achieved. This sense of enjoyment is related to the notion of the psychology of the tourist as visiting a city different in order to and gain some recreational experience by sight-seeing. Therefore, there is an underlying assumption of a psychology that drives what the urban tourist industry and its associated literature. This is based on the view that the city, and what it has to offer in terms of a visual aesthetic, is processed by psychological system. This in turn operates upon this in some way or other to produce an output such as a perception or feeling which becomes treated as an experience. The de-coupling of mental activity and social practices preserves an ideology of an economy of tourism as rooted in psychological discourse, and in particular the notion of personal enjoyment through sightseeing.

Urban sightseeing as the tourist gaze and aspect seeing

Much of the tourist guide literature refers to sightseeing and includes photographs of what are presented as notable places to visit (e.g., along the Royal Way in Prague). Therefore, the visual world for the tourist is a major aspect of their experience of the city. Some features of the urban landscape may be listed as 'must see' (e.g., Prague Castle) while others are included in terms of a more leisurely or wider interest (e.g., Letná Park). Imagination is therefore a key aspect of these guides in terms of the presentation of photographs and descriptions for the would-be tourist to project a mental image of visiting a destination.

In other words, sightseeing is founded upon perceiving the 'reality' of the historic urban landscape in a socially constructed manner. In this way a major dualism is maintained in the popular tourist gaze (Urry, 1990) as seeking to apprehend, grasp, understand or make sense or an experienced reality. This kind of perceptual-cognitivism is a cultural commonplace, actively maintained in the accomplishment of a range of social practices, including urban tourism. Much of this is accomplished through taking and sharing photographs of touristic experiences, as well as viewing and using images contained within popular tourist city guidebooks. Making tourism a visual event in this literature is therefore a means of maintaining the construction of tourism as a perceptual experience.

Tourists' perceptions of Prague are also in a sense related to the Wittgensteinian notion of 'aspect seeing' as discussed in the recent work of O'Sullivan (2017). In aspect experience there is not only an awareness of things in the environment, but also of the generalities under which they fall. In the case of, for example, the Royal Way, what is seen is not only specific buildings or monuments but also that they *are* the Royal Way. Wittgenstein (2009, § 160) also points to the nature of perception as a philosophical rather than its psychological matter: 'The concept of "seeing" makes a tangled impression.' He further cautions 'not to think in traditional psychological categories [by] simply dividing experience into seeing and thinking' (Wittgenstein, 1982, §542). In other words, it may be committing something of a conceptual error in supposing that experience can divided into its perceptual and thought elements. Aspect experiences are cases of visual experience that cannot be simply taken as referring to visible features of the environment. In this sense, seeing Prague is not only sightseeing in

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terms of looking at its architecture, monuments and the like, but *noticing/experiencing* these as features of historic Prague.

Making the urban landscape a must-see encounter

City tourist guides and brochures commonly use visual images to establish the nature of places and monuments of interest. The assumption is that people view such images as a way of 'understanding' the nature of these places prior to visiting them. In this way urban tourist sites are placed prior to this operation, as being a certain way and needing to be part of a sightseeing itinerary. In this communication model there is a realm of places and tourist sites and a realm of mental operations requiring to be brought together. Photographic images are taken as enhancing this process, of helping the reader to apprehend or grasp the nature of these sites. The selection and active constitution of tourism as social practices is occluded through the reification of this constructive process, through the 'externalisation of a tourist site/sight. It also creates a version of temporality in which the tourist destination becomes historically reified as something that has to be seen in a particular way. This can sometime have serious local effect as the result of the touristification of an area.

Take Prague, for example, and its transformation into a major tourist destination. The Royal Way has seen drastic changes in the use of its historic core and rapid changes along this main tourist axis. A number of buildings were converted from residential use to hotels and street-front spaces changed to bars, restaurants and souvenir shops. This is not surprising given the way that the Royal Way is marketed in tourism brochures and online tourist information sites. Take for example this description from the free travel guide Wikitravel (http://wikitravel.org/en/Royal_Way_of_Prague):

"If you have just a few hours to spend in Prague, you should travel the Royal Way. The Royal Way (Královská cesta) is the traditional coronation route of Czech kings. The way starts at the Republic Square, where a city seat of Czech kings used to be, passes many of Prague's most impressive sights and ends at Prague Castle. All of the three world wonders listed on the Hillman's list that happen to be in Prague (Old Town, Charles Bridge, and Prague Castle) are included in this itinerary. And, of course, the whole Royal Way is part of the Historic Centre of Prague which is listed on the UNESCO World Heritage list."

The effect of this kind marketing reifies the succession of narrow streets and various architectural forms and monuments that now constitute the Royal Way as being a must-see experience for the tourist. However, this status has transformed much of the traditional cultural, shopping and residential urban landscape into a monofunctional tourist-dominated environment (Cooper & Morpeth, 1998; Kádár 2013). This has resulted in a rapid decline in the local population of the centre (Ourednicek & Temelová, 2009), and in particular around the Royal Way (Simpson, 1999). As Kádár (2013) notes, this process of touristification of Prague has become the subject of attention for scholars in tourism studies. Dumbrovská (2017: 279), for example, has referred to the "tourist ghetto" on the Royal Way and notes that in 2015 90% of the Royal Way could be assessed as tourist-orientated based on services and facilities offered. Pixová and Sládek (2016: 87) conclude that, although there has been both organised and sporadic mobilisation against to the unregulated tourisitification process in Prague's historic core "will most likely remain untamed, at least while urban tourism flows are in full bloom".


The inclusion of the Royal Way in tourist guides as an essential part of the tourist itinerary and the way in which the visual and discursive are inter-twined provokes an active 'inner' response of imagination, of being a tourist. Here then the use of photographs and accompanying text is associated with the psychological notion of thoughts and feelings, and the construction of oneself as a tourist. The constitution of tourism as sightseeing is therefore a powerful and pervasive cultural feature that is implicated in the exportation of tourism as a perceptual experience, and one that those who market the city tourist services draw upon to such an effect.

The urban tourist capturing the image and the image of the tourist

In turning to how the tourist is made visible through the very images captured when on site Prague again serves as an example of urban tourism. It would be unthinkable for most tourists to travel without a camera; most readily accessible now in terms of mobile a phone but also through a conventional (digital) camera. People want to take their own photographs and images of the sites they have visited and to share these with others, most commonly now via social media platforms. This desire to capture the image can be so strong that, despite 'No Photography' signs at certain sites (e.g. religious sites, palace interiors, museums etc.) people will routinely ignore these and attempt to photograph or video record what they see. There is therefore a sense in which being a tourist involves not only seeing for oneself but also of capturing images. Indeed, as many tourists will know, it is often possible to spend more time actually capturing these images than appreciating various sites in situ. It is also the case that people take photographs and images of themselves 'experiencing' being a tourist at particular sites and of 'enjoying' themselves. Here the focus is not on the cityscape or monument itself but of photographs of tourists as being there. The socially constructed nature of tourism, as having 'been there, seen it and done it' effectively ensures its constitution as rooted in the psychology of the individual.

As in other tourist destinations, the cityscapes and various monuments where tourists photograph themselves create records of their visit as proof of their consumption of the experience offered by the city (Jenkins, 2003; Larsen, 2006; Garrod, 2009). The uploading of these photographs on social websites is useful in aggregating where such photographs are taken given the ubiquitous automated geotagged nature of upload. These precisely geotagged images show a pattern that gives realistic information on the number of interested visitors that corresponds with the main axial tourist routes in Prague (Kádár, 2013). Prague's urban spaces and streets have been transformed into tourist places to be seen. These thoroughfares and locales come to define where tourists go and in turn generate economic activity in the shape of buskers, restaurants, tourist information centres etc. However, as noted above they also generate considerable tourist traffic and congestion. This, in effect, is the urban tourist capturing the image of themselves in at one and the same time as the reifying the image of the tourists take photographs of themselves on the Charles Bridge (Fig. 5) and how the flow of tourists comes to define the image of the tourist as they traverse across the bridge (Fig.6).



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Figure 5: Tourist capturing images on the Charles Bridge (Author Photograph)



Figure 6: The image of tourists on the Charles Bridge (Author Photograph)

Conclusion

Urban tourism studies could benefit from engaging with the examination of the ways in which tourism is constituted as a perceptual experience rooted in perspectives on the city. Prague is an exemplar of this through the ways in which it is marketed in terms of its historic centre and associated architecture and monuments that constitutes the touristic experience. This constructs a version of Prague as a visually dynamic, exciting and an historic place to visit and explore. This is represented through a discourse of continuity in terms of the essence of the city, for example, through references to the Royal Way. Thus a selective telling of past is stitched together with its present form in order to inform tourists of what they are looking at and how to appreciate it. However, these marketing discourses can dominate to such an extent that they can lead to the touristification of urban environment. In effect, these discourse become a victim of their own success and lead to parts of the city as being considered as must-see sights.

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The Examination of Arm Wrestlers' Leisure Time Approach and Hopelessness Level

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Abstract

The purpose of this study was to examine university arm wrestlers' leisure time approach who have attended university wrestling championship defined as sportive recreation activity and those' hopelessness level. Personal information form developed by researcher and Beck Hopelessness survey were applied on 186 university arm wrestlers. Findings were analyzed by using SPSS 23 packet program. Frequency method (%) was used in order to determine athletes' personal information distribution, and MANOVA was used for multiple comparisons. Results showed that arm wrestlers stated their leisure time partly enough; they assessed their leisure time with sport related recreation activities; and they stated how they assessed their leisure time was related with their habits and appropriate for their abilities. According to total mean score of arm wrestlers' hopelessness level, they have mild level hopelessness. Mean scores of sub-domains of survey were also low and variables related with leisure time were no significant effect on hopelessness level.

Keywords: Arm wrestlers, Hopelessness, Leisure time **Main Conference Topic:** Sports Science, Recreation Science, Psycho-Social Science

Introduction

People have different expectations from the future during their life. These expectations or in other words hopes changing according to age, gender, personality characteristic, owned facilities, near and far goals are the supporter for person's self-actualizing, meaningful and easy to pass of life (Kuloğlu, 2001).

Hope is the expectations more than zero which are to achieve goal for the future. The belief that there is a solution and can occur differences on person's life via appropriate aid is the most important feature of hope (Sayar, 2012). The concept of hope is examined as emotion, expectation and desire. It is an instinctive component of human life and it preserves individuals from harm and makes easier to show their potential (Balkanlı, 2008).



Hopelessness, contrary to hope, is negative perspective on the plight of individual and possible problem which he can meet. According to Fromm (1995), hope is not a passive waiting, but is not a force to happen something which is impossible to happen (Tekin and Filiz, 2008). Hopelessness, by the way, is a space that formed as a result of past experiences and is to collapse bridge that connects moment and future. Hopelessness is a reflection of possibility of being able to reach one's purposes. In hopelessness, there are disappear of expectations through specified purposes to be achieved and failure judgment. In hope, there is a thought that determined plans can be applied. Because of individual and situational differences, the format of emergence of these two concepts is different (Dilbaz and Seber, 1993).

While emerging adulthoods, majority of population of our country, are trying to adapt changes and developments of their bodies, they must respond expectations from society and comply with social roles and rules (Şahin, 2009).

Emerging adulthoods come to new environment when they become university student. Both they adapt themselves to university environment and different place. It can be said that emerging adulthoods establishing interactions reflect their communication skills developed during parent interaction process on this new environment. Hence, communications developed on parent seem very important for new life of them. Additionally, they experience future concerns, social support, economical problems while getting accustomed to their new roles (Şahin, 2009). These problems in education process increase hopelessness level of them (Özmen et all., 2008). In addition to all, emerging adulthoods can install different meanings, experience intense distress and despair about future and feel inadequate in finding solution to their problems during this new process. All of these factors drive them to hopelessness (Şahin, 2009). However, culture, art and sport which colorize and pleasurable life decrease hopelessness level of them (Sayar, 2012).

Recreation which constitutes content of these definitions mentioned above is a concept indicating leisure time activities of people and is related with activities people attend in their leisure time except their working hours. Leisure time activities include a wide range of daily, weekends, annual leaves, longer holidays and retirement activities. They make sense through separate aims and wishes of people. Because of this feature, it is difficult to indicate precise definition recreation. Nevertheless, there are some definitions from a broad perspective and various approaches (Karaküçük, 2008).

While some definitions indicate recreation just as a renewal, others define it as activity (Torkildsen, 2005). Recreation is defined as regenerating, soothing and volunteer activities after regular working hours (Bucher et al., 1974; Edginton and Ford, 1985; Hacioğlu et al., 2009; Kraus, 1985). The Turkish Linguistic Society (2005) indicates that recreation is volunteer activities people attend on their leisure time with the aim of fun and sport, and rebuilding.

Sport is defined that it improves body and spirit health of human who is primary element of economical, social and cultural improvements; to provide for the development of character properties; to make easier for adapting environment with getting knowledge, skill and ability; to ensure solidarity, cohesion and peace on individuals, communities and nations; to struggle within competition rules besides improving competition spirit. Because of these features, sport is universal besides it is very versatile, very useful, multi-purpose and multi-various sizes (Yetim, 2011). Individuals can do sport for different purposes.



Sportive recreation, the combination of sport and recreation, is not professional sport awarded as professional way; but it is motivated by "fun" purposes and "social awards". Recreational sports are outdoor, team, individual, aquatic, air, motor, combat, racket sports, recreational sport activities in parks, folk dance and dancing, and sports in sport center (Ardahan, 2013).

Hence, sport centers and facilities are important for doing recreational sport. Recreational facilities provide for resolving individuals' needs. Activities socially beneficial on individual have contributions for social cohesion and integration (Çoruh, 2013).

"Psychological need" is the source of various behaviors or is supposed to shape behavior. Leisure time is important for clear away the pressure of working hours on us, fatigue and some stress factors. Individuals need more leisure time and recreation facilities in order to get rid of the clutter and monotony (Çoruh, 2013). Nowadays human's fatigue and problems on parent, school and business life cause disturbing nervous system and decreasing endurance of him. Different stress makers and responds of human against these stresses revealed by modern life find out an important sickness (Karaküçük, 2008). People need to be emotionally satisfied in order to get rid of or get away from the stress of everyday life. People want to get into different environment and gain moral for getting away from these pressures. These environments are leisure time activities for resting, relaxing, having fun and regenerating. Many psychiatrists state recreation as effective element for finding life balance and happiness. Leisure time is an important implement not only for preventing illness, but also carry on psychological health. Psychiatrists believe that recreation prevent mental and emotional disorders (Kraus, 1985).

University sport competitions have a very suitable environment for university students to socialize with other university students. These competitions also increase health and create positive effects on students. They also allow students to get rid of psychological negative effects. The purpose of this study was to examine university arm wrestlers' leisure time approach who have attended university wrestling championship defined as sportive recreation activity and those' hopelessness level.

Related works

In literature, there were some studies examining hopelessness level with using Beck Hopelessness Tool (Çeliken & Erkorkmaz, 2008; Şahin, 2009). For example, Çeliken and Erkorkmaz (2008) studied on 935 women, 1036 men whose age 15-18. Results showed that men's hopelessness level was higher than women. The study of Şahin (2009) investigated hopelessness level of Faculty of Education students. Findings indicated that hopelessness level of participants was low and they had intensive hopelessness.

Sportive recreation activities have been studied in literature (Soyer & Can, 2002; Arıkan & Ozkokeli, 2002). For example, Soyer and Can (2002) examined on 375 university students. Findings indicated that participants couldn't attend to sportive recreation activities because of some reasons although they would like to join a lot. Another reason was insufficient university facility. In study of Arıkan and Ozkokeli (2002), Leisure Activity Expectations of Police Academy Students were studied. Results pointed out that %16,5 of the students want to be increased number of social and sportive facilities while %13,5 of the students want to be increased number of sportive organizations in management of Police Academy.



Model

Research Method

Descriptive survey model was used for this study. Descriptive statistic is the statistical process which allows collection, description and presentation of numerical values of a variable (Büyüköztürk, 2008).

Research Group

Participants of this study include 121 (65.1 %) male and 65 (34.9 %) female, totally 186 arm wrestlers attending Turkish University Arm Wrestling Championship. According to athletes' age distributions, the highest percentage was 21 years (N= 50, 26.9 %) and the lowest percentage was 30 years (N= 1, 0.5 %) athletes. The highest percentage for income status was 2001-3500 TL (N= 49, 26.3 %) and the lowest percentage was 501-1000 TL (N= 16, 8.6 %).

Data Collection Tools

Data collection tools of this study consist of two parts. First one is "Personal information form" and second one is Beck Hopelessness Tool (BHT).

Personal Information Form

To collect data from university arm wrestlers who attended Turkish Arm Wrestling Championship in 2017, information form comprising 7 questions was used.

Beck Hopelessness Tool (BHT)

Beck Hopelessness tool (BHT) was developed by Beck, Weissman, Lester and Trexler (1974) in order to evaluate hopelessness level of participants. Validity and reliability of BHT were tested by Seber, Dilbaz, Kaptanoğlu, Tekin, (1993) and Turkish validity was determined by Durak and Palabıyıkoğlu (1994). In Seber at all. (1993)' study, internal consistency coefficient was checked and found .86. Item total correlation was from .07 to .72 and test-re-test value was .74 (Aslan, 2013).

Beck and Steer (1988) defined that tool had 20 items which comprise 11 true and 9 wrong answer keys. Tool provides true-wrong and yes-no answer styles for participants. If answer is "Yes" on "2, 4, 7, 9, 11, 12, 14, 16, 18 and 20." items, 1 point is given; if answer is "No" on "1, 3, 5, 6, 8, 10, 13, 15 and 19." items, 1 point is given. According to collected points, total score from 0 to 20 points indicates hopelessness level of participants (Aslan, 2013). Tool has 3 sub-domains;

Emotions about future; 1, 6, 13, 15, 19 items, Loss of motivation; 2, 3, 9, 11, 12, 16, 17, 20 items, Expectations from future; 4, 7, 8, 14 ve 18 items (Gençay, 2009).

Total score is ranged from 0 to 20 points. Total score points out hopelessness level of participants. If total score is high, hopelessness level and negative expectations from future are high for participants (Gençay, 2009; O'Conner, Connery and Cheyne, 2000; Tanaka, Sakamoto, Ono, Fujihara and Kitamura,, 1998). Beck, Steer and Garbin (1988) divided participants in four groups according to their total scores: a) 0-3 points, there is no

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hopelessness; b) 4-8 points, there is a mild hopelessness; c) 9-14 points, there is a moderate hopelessness, and d) 15-20 points, there is a highest degree hopelessness (Gençay, 2009).

Data Collection Process

Data were collected from participants in Turkish Arm Wrestling Championship in 2017. At the beginning, participants were informed about aim of the survey and data collection tools. They also signed personal consent forms. Then, BHT was given them to fulfill. Duration for completing survey was twenty minutes and extra time wasn't allowed. Silence and appropriate light of place for filling BHT were ensured.

Results

According to table 1, the highest percentage for weekly leisure time was 4-7 hours (N= 62, 33.3 %) and the lowest percentage was 12-15 hours (N= 19, 10.2 %). The highest percentage for owned leisure time of participants was insufficient leisure time (N=76, 40.9%) and the lowest percentage was partly sufficient leisure time (N=44, 23.7 %). According to distribution of leisure time assessment type, the highest percentage was sportive facilities (N=109, 58.6 %) and the lowest percentage was touristic facilities (N=1, .05 %). In distribution of reasons to prefer, the highest percentage was appropriate for abilities and habit (N=91, 48.9 %).

		N	%
	1-3 hours	35	18.8
	4-7 hours	62	33.3
Weekly Leisure	8-11 hours	36	19.4
Time	12-15 hours	19	10.2
	16-more hours	34	18.3
	Insufficient	44	23.7
Owned Leisure	Partly sufficient	76	40.9
Time	Sufficient	66	35.1
	Sportive facilities	109	58.6
	Social facilities	29	15.6
Leisure Time	Cultural facilities	5	2.7
Assessment Type	Artistic facilities	5	2.7
	Touristic facilities	1	.5
	Resting facilities	33	17.7
	Others	4	2.2
	Appropriate for abilities and habit	91	48.9
	Social environment	50	26.9
Reasons to Prefer	Facility places I want	8	4.3
	Health	12	6.5
	Much	13	7.0
	Others	12	6.1

Table 1. The Distribution of Arm Wrestlers' Demographic Features related with Leisure

Time

AC-TTSS 2017



Table 2 showed that mean of emotion about future was 1.06 (SD=1.41), mean of loss of motivation was 2.52 (SD=1.97), and mean of expectations from future was 1.72 (SD=1.40). Mean value of participants' total hopelessness was 5.84 (SD=4.18).

	N	M	SD
Emotions about future		1.06	1.41
Loss of motivation	186	2.52	1.97
Expectations from future	100 _	1.72	1.40
Total	-	5.84	4.18

Table 2. Arm Wrestlers' Hopelessness Level

MANOVA used for multiple comparison indicated that there was no significant interaction among variables ($F_{(27,399)}=1.13$, p>.05). Because there was no interaction, ANOVA (multivariate ANOVA) test was used for checking univariate comparison. ANOVA results showed that weekly leisure time ($F_{(4,133)}=1.88$), owned leisure time ($F_{(3,133)}=1.30$) and leisure time assessment type variables had no statistically significant effects on emotion about future, expectations from future and loss of motivation variables (p>.05).

Discussion and Conclusion

When arm wrestlers' demographic findings focusing leisure time were assessed, it could be defined that they had different weekly leisure time and different leisure time duration, but they also stated that their owned leisure time was insufficient. Results showed that wrestlers chose sportive activities on their leisure time. This was most probable the reason that they were already athlete. Why participants chose appropriate for abilities and habit as reasons to prefer could be interpreted as individuals enjoyed the spend time on fields they were talented and they had intense training and competition periods, and these periods turn into a habit over time.

Hopelessness level of arm wrestlers was found between "4-8" ranges which were mild hopelessness level (Beck at all, 1988; Gençay, 2009). Moreover, it could be said that arm wrestlers' hopelessness level was low and mean scores of emotion about future, loss of motivation and expectations from future sub-domains were low. In other words, arm wrestlers had hope about emotion about future, loss of motivation and expectations from future. Some studies had similar results with our study. For example, Karaman (2015) examined hopelessness level of individuals attending recreational sportive activities and effects of independent variables on hopelessness level. Results of this study showed that individuals attending recreational sportive activities had mild hopelessness level. Study of Yiğiter (2014) indicated that regular exercise decreased hopelessness level.

As a conclusion, variables related with leisure time such as weekly leisure time, owned leisure time, leisure time assessment type and reasons to prefer variables had no effect on arm wrestlers' hopelessness level. For future studies, the examination of hopelessness level on different sport athletes or sedentary are highly advised.

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Examination of the Relationship Between Decision Making Levels and Problem Solving Ability in Chess Players

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Abstract

The purpose of this study is to examine the relationship between decision-making levels and problem-solving skills of chess players studying at our university and participating in the chess championship which is included in the activities of Sports Federation. The sample of the research consists of 92 university students participating in the chess championship from different departments. In the study; personal information form prepared by the researcher, Problem Solving Inventory and Melbourne Decision Making Scale I-II were applied. Research data were analyzed using SPSS package program. Frequency and Canonical Correlation Analysis were used in the data analysis process. When the findings of the study are examined; the relationship between decision making and problem solving variables has been found at a moderate level and in a positive direction. It has also been found that decision-making levels of chess players influence problem-solving skills.

Keywords: Chess Player, Problem solving, Decision making **Main Conference Topic:** Sports Science, Psycho-Social Science

Introduction

The decision is to choose the most appropriate form of action possible to achieve a goal in accordance with the possibilities and circumstances available. Decision making is the whole of cognitive and behavioral efforts enabling us to make choices and preferences across a variety of situations and events (Yiğit, 2005). Decision-making behavior occurs in everyday life, from the birth to the death of an individual. They have to make the right and proper decisions for themselves in the face of sudden situations or events that meet their needs. Appropriately made decisions lead to positive outcomes in the individual's life while those who fail to make the right decisions face negative consequences (Pamuk, 2016).

Individuals are faced with numerous decisions in their daily lives, but the structure of these situations can be very complex (Onaran, 1971). Decision-making can be defined as a remedy of a struggle when there is more than one way to reach an object that is thought to be



needed. It is more important to design the results and to focus on reaching the goal when it is necessary to decide on important issues (Larson, Butler, Wilson, Medora and Allgood, 1994).

The first person to suggest that scientific methods can be used in the decision-making process is John Dewey. It is stated in his studies that the decision making process is composed of such stages as the understanding of the problem, collection of information about the problem, analysis and interpretation of the information, Evaluation of options and alternatives, determining the best option, application and evaluation of decision-making style (Semerci, 2000).

It is possible to define the concept of problem as follows; "The problem that does not have a standardized solution because it was encountered for the first time and can be solved by using the knowledge of the individual in an accurate way" or "an obstacle and an intrinsic tension that disturbs the balance of the individual" (Erzincanlı, 2010). The concept of "problem solving" which can be used synonymously with the concept of "coping with the problem", can be defined as "the process of defeating difficulties in reaching an objective" (Heppner ve Peterson, 1982).

In today's society, those who have creative, critical and analytical thinking skills and who are able to solve the various problems they face, are successful (Kelleci ve Gölbaşı, 2004). The problem, on the other hand, is the difficulties that the individual faces in achieving a goal. The individual is faced with difficulties related to work, family and social environment throughout his / her life. Solving the problems is to overcome these difficulties in life. The individual can succeed in life as long as he can overcome these difficulties. Individuals who are able to solve their problems increase their commitment to life. Problem-solving skills are one of the most important features of the individual to deal with the environment (Arslan, Dilmaç, Hamarta, 2009).

Problem solving is a mental process (Kaya, 2005). Problem solving ability affects positively social cohesion and the success of an indvidual in daily life (Sardoğan, Karahan, Kaygusuz, 2006). Self-confident individuals are able to solve their problems more easily than those who do not. Individuals who can solve their problems are more confident and able to make the right decisions in case of decision making (Deniz, Arslan, Hamarta, 2002).

The determination of the problem is very important for the formation of other phases in order to overcome a problem (Koçoğlu, 2015). According to Chase, the first step in the decision making process is to identify the problem. According to him, the stage of problem determination actually constitutes the thinking stage of the decision making. At this stage, he emphasized that it is necessary to define the target at the end of the decision to be given as well as to identify the problem.

It is known that some activities that individuals participate in social life have positive effects on psychological characteristics. Sports activities are among the first ones of these activities. It has been reported that in many studies take part in sport literature, participation in the sport activities protects and improves physical health as well as psychological health (Öztürk, Koparan, Efe, 2008). When considered as a sports branch, it seems that many different topics have been studied about the chess branch. When considered as a sports branch, it can be seen that studies on chess branch have been made in a very different way. Given the fact that chess requires problem-solving skills and planning skills to calculate many moves in advance, in these studies, it was sought to answer the question that if the chess players can solve the problem better than the individuals who did not play chess. It also

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stated in these studies that chess provides the practice of making quick and perfect decisions under time pressure. Chess also teaches you how to think logically and effectively by teaching you to choose the best among many options and as a result it shows the importance of flexible planning, concentration and decisions (Ün, 2010).

In this study, it is aimed to investigate the effect of decision levels of university students interested in chess sports on problem solving skills.

Related works

In literature, there were some studies examining problem solving abilities with using Problem Solving Inventory (Heppner & Peterson, 1982). For example Erhan, Hazar and Tekin (2009) studied on schoolchildren who play chest and those non-playing chest. Results showed that planned approach level of schoolchildren playing chest was higher than those non-playing students. Another result indicated that husty and avoident approach level of non-playing students was higher than chest playing students.

Problem solving level of physical education and sports students was determined on the study of Doğan (2016). He examined 336 students and found that participants had moderate problem solving level. Cantav (2016) investigated problem solving level of 394 university students in terms of gender. Results showed that men's problem solving level was highr than women's problem solving level.

Decision making level has been studied in literature (Eraslan, 2012; Taşgit, 2012). Study of Eraslan (2012) examined creativity and decision making skills of university chess players according to some variables. In terms of gender, results showed that men chess players decide more careful than women chess players. Similar results have been found in study of Taşgit (2012) who studied on 1855 university students. Findings indicated that men's decision making level was higher that women's decision making level..

Model

Research Method

The research was conducted using the descriptive scanning method. Descriptive statistics are statistical operations that allow the collection, description and presentation of numerical values for a variable (Büyüköztürk, 2010).

Research Group

The sample group of the research is composed of 92 chess athletes participating in different parts of the universities to the chess championship which is included in the Federation Sports Activities of University Sports. The number of male participants is 66 (71,7%) and the number of female participants is 26 (28,3%). According to the age distribution of the athletes, the age range varies between 18-27 and 28.3% of athletes (26 athletes) are 21 years old; According to the class distribution, it is determined that 40.2% of the athletes are studying in the 2nd class.

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Data Collection Tools

The form used as data collection tool in the research consists of two parts. The Problem Solving Inventory (PSI) and Melbourne Decision Making Scale I-II (MDMS I-II) were used to investigate problem-solving skills and decision-making style of the chess players.

Personal Information Form

An information form consisting of 4 questions was prepared by the researcher in order to collect information about the chess athletes participating in the chess championship which is included in the Federation Sports Activities of University Sports in 2017.

Problem Solving Inventory (PSI)

Problem Solving Inventory (PSI): Problem Solving Inventory was developed by Heppner and Peterson (1982) to measure the level of individual problem solving skills. The first adaptation, validity and reliability studies of the Problem Solving Inventory were carried out by Taylan (1990). In Taylan's validity study, the correlation between problem-solving inventory scores and self-acceptance inventory scores was calculated as 0,44 and the correlation between trait anxiety inventory scores was calculated as 0,51. In the study of reliability of the scale; The reliability coefficients between English and Turkish applications were calculated as 0,86 for total score, 0,86 for problem solving confidence, 0,64 for approach-avoidance style and 0,73 for personal control. The correlation coefficients between the total score of the scale and the subscales were calculated as 0,82 for problem solving confidence, 0,41 for approach-avoidance style and 0,58 for personal control. The stability coefficients obtained by the test-retest method were 0,84 for problem solving confidence, 0,47 for approach-avoidance style, 0,48 for personal control, and 0,66 for sum of scale.

The second study on Turkish adaptation was made by Sahin, Sahin and Heppner (1993). Problem Solving Inventory is a 6-point Likert-type measure consisting of 35 items. Thirty-two items are required for the evaluation. As a result of the factor analysis, it was found that the scale consists of 6 factors; hasty approach, thinking approach, evasive approach, evaluative approach, self-confident approach and planned approach. The lowest score that can be taken from the scale is 32, the highest score is 192. The high scores on the scale indicate that the individual perceives himself as inadequate in problem solving skills. The Cronbach Alfa reliability coefficient of the scale has been found as 0.88 in the study conducted on 244 university students. Single and even numbered items separated and reliability coefficient obtained by split half method has been found as r = .81. The correlation coefficient between Scale and Beck Depression Inventory is ,33. In this study, Cronbach Alpha reliability coefficient of "Problem Solving Inventory" has been found as .85. Reliability coefficients for sub-dimensions of Problem Solving Inventory are as follows: 0,50 for "hasty approach", 0,69 for "Thinking Approach", 0,69 for "Avoiding Approach", 0,62 for "Evaluative Approach", 0,72 for "Self Confidence Approach" and 0,69 for "Planned Approach".

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Melbourne Decision Making Scale I-II (MDMS I-II)

The Melbourne Decision Making Scale I is a measure aimed at determining self-esteem in decision making. It contains six substances. According to the responses given to the items, the scoring is as follows: "correct" is two points, "sometimes correct" is one point, "not correct" is zero point. The maximum score that can be taken from the scale is "12". High scores indicate that self-esteem is high in decision-making. The Melbourne Decision Making Scale II consists of 22 items. The scale measures the decision-making style. There are four separate subscales of this scale. These are careful, avoidant, repulsive and panic decisionmaking styles. Bu This scale is answered just like the first scale. Higher scores indicate that the relevant decision-making style is being used. The reliability coefficients of the subscales were calculated as follows: 0,80 for the attentive approach, 0,87 for the evasive approach, 0,81 for the aggressive approach and 0,74 for the panic approach (Mann et al., 1998). The adaptation studies of Melbourne Decision Making Scale I-II to Turkish have been carried out by Deniz (2004). In the reliability study on university students, the reliability test of Melbourne Decision Making Scale I-II has been calculated separately using the internal consistency method. The reliability coefficients obtained from the subscales by the test-retest method ranged from r = .68 to r = .87. Internal consistency coefficients of Melbourne Decision Making Scale I-II ranged from Alpha = .65 to Alpha = .80. The similar scale validity study of Melbourne Decision Making Scale I-II has been made through the Decision Strategies Scale developed by Kuzgun (1992). The correlation coefficients between Melbourne Decision Making Scale I-II and KSÖ subscales ranged from r = .15 to r = .71(Deniz, 2004).

Data Analysis

In the analysis of the data, Canonical Correlation analysis was used to examine the relationship between frequency and decision making styles and problem solving variables. Analyzes were performed with the SPSS 23.0 package program.

Data Collection Process

Data were collected from participants in Turkish Chess Championship in 2017. At the beginning, participants were informed about aim of the survey and data collection tools. They also signed personal consent forms. Then, PSI and MDMS I-II was given them to fulfill. Duration for completing survey was thirty minutes and extra time wasn't allowed. Silence and appropriate light of place for filling PSI and MDMS I-II were ensured.

Results

According to table 1, Canonical correlation coefficient (rc) was detected as .69. It represents moderate positive (Rumsey, 2009) relation between decision making and problem solving. Moreover, 37% of the total variance of problem solving variables were explained by decision making variables whereas 18% of the total variance of decision making variables were interpreted by problem solving variables.

First canonical variate proved that volunteer motivation variables were correlated with sense of community variables significantly (\times^2 (30) = 102.72, p = .00). Except for Panic decision making (.23) from first set, first set of variables including self-esteem in decision making (.87), careful decision making (.86), avoidant decision making (.43) and pending decision making



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(.35) were associated with second set of variables including hasty approach (.45), thinking approach (.82), avoidant approach (.31), evaluative approach (.39), self-confident approach (.73) and planned approach (.63) as all of the scores exceeding the value of (.30) (Tabachnick & Fidell, 2012).

	Canonical Chance Variate				
	Correlation	Coefficient			
Decision Making Variables					
Self-esteem in decision making	.87	.53			
Careful decision making	.86	.42			
Avoidant decision making	.43	.35			
Pending decision making	.35	.10			
Panic decision making	.23	.03			
Percentage of variance	.37				
Excess Value	.18				
Problem Solving Variables					
Hasty approach	.45	.46			
Thinking approach	.82	.74			
Avoidant approach	.31	.17			
Evaluative approach	.39	.21			
Self-confident approach	.73	.16			
Planned approach	.63	.17			
Percentage of variance	.34				
Excess Value	.16				
Canonical Correlation	.69				

Table 1. Canonical Correlation Results of Chess Players

Discussion and Conclusion

When the findings are examined; the hypothesis we have established - "There is a relationship between chess athlete's decision-making levels and problem solving abilities."-has been proven. The relationship between decision making and problem solving variables has been found at a moderate level and in a positive direction. It has also been found that decision-making levels of chess players influence problem-solving skills. This result is also consistent with the findings of Phillips, Pazienza, and Ferrin (1984) who examined the relationship between decision-making behaviors and problem-solving skills perceptions. Findings indicate that individuals using logical decision-making strategies approach problems rather than avoid problems.

Decision-making is about determining what action to take, and usually the choice to be made between options. The goal of problem solving is usually to get a solution, answer or result. (Adair, 2017). Starting from this statement, it can be said that chess players have taken a good approach in applying the decision style to the problems encountered in everyday life, do not hesitate to think on the problematic situation and it is not difficult for them to



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decide which is the most suitable option. In the studies on instability, it is seen that the individuals with instability problem have low self-confidence and self-esteem levels and high anxiety levels. Again, according to these studies, it is seen that the individuals who have this problem have attentive and externally supervised personality traits(Lucas and Epperson, 1988, Ferrari and Dovidio, 2001; Akt: Sardoğan, Karahan and Kaygusuz, 2006). Given the results of these studies and the fact that the decision making is a problem-solving process, it is important to emphasize the importance of not remaining in ambiguity in decision-making and choosing the best option and implementing this option.

Consequently, we can say that the decision-making levels of chess athletes have a positive impact on their problem-solving skills and the correct decision-making and problem-solving skills can support athletic identities.

In future works, it is suggested that the relationship between decision-making style and problem-solving skills should be applied to sportsmen in different sports branches, and studies should be conducted to improve decision-making levels and problem-solving skills.

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Niche Focused Tourism Development in Small Island Developing States: the case of Trinidad

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Abstract

The sustainability of small island developing states depends in part on the extent to which these islands can diversify their product offerings in the midst of an increasingly competitive global tourism marketplace. Several approaches to niche focused tourism development have been identified. The focus of this paper is an analysis of the stakeholderinformed approach adopted by Trinidad in determining its niche tourism products for development. This approach allowed for the inclusion of diverse perspectives and generated a high degree of consensus among the stakeholders. However, there was insufficient focus on external factors that influence niche product development. A more balanced approach is required that considers both the internal and external environments. Further, it is recommended that a balance scorecard model be adopted to rank identified niches as it provides a quantitative dimension to a qualitative process of niche selection.

Keywords: Tourism, Niche, Product, Stakeholder **Main Conference Topic:** Tourism

Introduction

The operating environment for tourism continues to evolve in the increasingly competitive global tourism marketplace. This puts destinations under tremendous pressure in some instances to remain competitive whilst others strive to become competitive. For the island of Trinidad, the energy sector has assumed the dominant role of income earner and has been the engine of growth over the last four decades. As a result, the country's travel and tourism growth has been slow moving as compared to the other islands in the Caribbean. Government policies have historically sought to limit and control tourism activity and the oil boom of the 1970s diverted attention away from tourism as a source of foreign exchange revenue. However, within recent times, tourism has been identified as one of five sectors that should be developed to promote economic development and reduce the country's reliance on the energy sector.

As compared to its Caribbean neighbors, Trinidad does not possess the azure seas and unblemished white-sand beaches that the Caribbean has become known for. Therefore, if Trinidad is to establish a competitive edge in the tourism industry, consideration must be given to viable alternative niches to the traditional 3S tourism product of the Caribbean. It is with this in mind that the purpose of this paper is to examine the most appropriate approach to niche focused tourism development in small island developing states (SIDS) with a focus on the case of Trinidad. The paper begins with an overview of the concept of niche focused tourism development followed by an examination of various approaches to niche product development. This will be followed by an analysis of the approach adopted by Trinidad in the



identification of its niches for further tourism development. The paper concludes with a discussion on the most appropriate approach to niche focused tourism development in SIDS.

Literature Review

Understanding Niche Tourism Development

Over the last two decades there has been an on-going debate about the sustainability of what is commonly referred to as 'mass tourism'. A product of the 1960s and 1970s, mass tourism is a phenomenon of large-scale packaging of standardized leisure services at fixed prices for sale to a mass clientele (Poon, 1993). Although this mass consumption of tourism continues to sustain many destinations, some of the recurring challenges with mass tourism include environmental degradation, socio-cultural disturbances and economic leakages. As Poon (1993) further noted, a new tourism has emerged which is characterized by flexible, segmented & environmentally conscious holidays. As a result, there has been a gradual shift away from total reliance on the traditional 'mass tourism' towards embracing more alternative forms of tourism. More specifically, this move gave rise to the concept of 'niche tourism'.

According to Robinson, Heitmann and Dieke (2011:9), niche tourism can be defined as "catering to the needs of specific markets by focusing on more diverse tourism products". Novelli (2005:5-6) goes further to place niche tourism on a spectrum where on one end it can be defined as "breaking down into still relatively large market sectors (macro-niches – i.e. cultural tourism, sport tourism etc.), each capable of further segmentation (micro-niches- i.e. geo-tourism, cycling tourism etc.). At the other end of the spectrum, niche tourism is focused on very precise small markets that would be difficult to split further". Toften and Hammervoll (2011) also describe niche tourism as a superior and focused approach directed at a limited and specialised market with relatively few customers and competitors. Inherent in these definitions is the notion that niche tourism represents diversity and provides more customized experiences for the more experienced and discerning tourist.

There are two main factors driving niche tourism development including increased competition and increasingly more experienced tourists. In terms of the former, hypercompetition among tourism businesses and destinations has facilitated the creation of niche tourism as businesses and destinations seek to gain competitive advantage (Novelli, 2005; Macleod, 2003; Lew, 2008). With respect to the latter, tourists are increasingly sophisticated in their needs and preferences and strive to ensure that they are met. A niche focused approach is different to a mass market approach and caters to the increasing diversity in customer tastes and habits, as well as the changing needs of business and the environment (Dalgic & Leeuw 1994). According to Kotler (2003), focusing on customers with a distinct set of needs or developing small specialty products can attract customers willing to pay a premium. By specializing along market, customer, product or marketing mix lines a destination can match the unique needs of its customers (Shani & Chalasani 1992).

Approaches to Niche Tourism Development

At the core of niche tourism development is the selection of an appropriate product mix to comprise the destination's tourism portfolio. The development of a product-mix allows the destination to produce in a way that maximizes the total contribution to profit/throughput subject to constraints imposed by resource limitations, market demand, and sales forecast. Three main approaches to niche product development have been purported including a focus on market competitiveness, mega trends influencing product development and tourism product diversification. The first two are outward looking strategies that focus on the external environment and its impact.



Hassan (2000) outlines several areas in Figure 1 that should be taken into consideration when diversifying in order to remain competitive. The external environment which includes; political, cultural, technological and socio-economic factors and trends all shape and influence industry specific variables (demand, industry structure, environmental commitment and comparative advantage) which then impacts upon the competitiveness of the market. The demand and supply of certain tourism niche products is therefore determined by the external global competitive environment (Murray & O'Neill 2012; Sakarya, Eckman & Hyllegard 2007).

Understanding the global competitive environment can assist destinations in selecting and developing the most appropriate niche products to invest and develop leading to competitive advantage (Dwyer et al 2009; Dwyer & Edwards 2009; Schilling & Hill 1998; Toften & Hammervoll 2011; Murray & O'Neill 2012). Nill & Kemp (2009) address this as a key factor leading to Strategic Niche Management (SNM) which is an evolutionary approach aimed at fostering sustainability benefits by examining the external environment with being innovative in a competitive environment.



Figure 1- Factors shaping Market Competitiveness

Source: Hassan (2000: 241)

Dwyer et al (2009) builds upon the ideology espoused by Hassan (2000) and Nill & Kemp (2009), and showcases how tourism megatrends (external environment) impact upon visitors, tourism flows, enterprise management and the destination. The impact of megatrends on these aforementioned areas, influence and shape the product development process (Schilling & Hill 1998; and Dwyer & Edwards 2009). Once destinations can cope with the external environment and adapt their processes accordingly, it augers well for the production of new products that have potential giving destinations a strategic option in a globally competitive environment. Dwyer et al (2009) showcases the megatrends as it influences new product development in Figure 2.

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Figure 2- Mega trends influencing product development



Source: Dwyer et al (2009: 71)

In their model, the authors (Benur & Bramwell 2015) conceptualize the strategic options available for tourism destinations in Figure 3 by examining two features, namely: the extent of product diversification (on the horizontal axis), and tourism product intensification (on the vertical axis); both of these features have a scale ranging from low to high. The scales help to identify broad options for tourism development at destinations. They argue that destinations may seek to diversify their product portfolio by the creation of "new bundles or combinations of products in destinations" (Benur & Bramwell 2015, 217) through promoting and packaging existing tourism products or through the development of new tourism products. Development of new tourism products can also be accomplished through the connection of already established forms of tourism with alternative/niche tourism products. They refer to the pairing of mass tourism products such as beach resorts, which provide a significant number of tourists, with niche tourism products including cultural tourism.



Figure 3- Framework of tourism product development options

Source: Benur and Bramwell (2015: 220)

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In addition to the models discussed, the literature makes reference to a number of considerations that must be addressed in niche development

The Trinidad Context

Trinidad lies within one of the world's most tourism-intensive regions, the Caribbean. Yet, unlike its neighbours, it has not relied heavily on income from travel and tourism since its economy is dominated by the energy sector that contributes approximately 34.1% to the country's GDP. However, within recent times, tourism development in Trinidad is at a crossroad with greater focus being placed on tourism as a key sector in the diversification thrust of the island. It is with this in mind that a decision must be made as to the policy direction on the core niches that should be supported, developed and marketed over the next five (5) years. The government is of the view that it is prudent for any destination to offer diverse experiences in order to appeal to a wider cross section of visitors and to ensure maximum visitor satisfaction. Therefore, a niche market approach to the development of tourism in Trinidad was proposed. The Ministry of Tourism established a Tourism Standing Committee (TSC) for the Strategic and Sustainable Development of Tourism in Trinidad to propose the strategic direction for tourism over the coming years.

Methodology

A qualitative approach to niche tourism development was adopted which included two phases. In phase one, the (15) member private/public sector TSC explored a number of key considerations and examined secondary data on the niches currently promoted by the destination in determining the proposed way forward. Some of the considerations included visitor arrivals, tourist expenditure, accommodation stock, international tourist trends, destination targets and core resources and attractors. Based on the research, the Committee prepared a presentation outlining its preliminary views on a potential core niche for the destination, that of Business/MICE Tourism. Potential supporting niches identified included Festival Tourism, Sport Tourism and Ecotourism. Phase two was the hosting of a Stakeholder Forum where sixty four (64) persons participated, representing twenty (20) stakeholder groups. The participants were randomly divided into seven (7) groups and each group was asked to consider the following questions and provide oral feedback:

- 1. What in your view should be the core niche product for destination Trinidad?
- 2. Identify at least (3) supporting niche products for destination Trinidad.
- 3. What factors should be considered when determining the core and supporting niches?
- 4. What measures should be put in place to ensure the successful implementation of the niche products selected?

Findings and Discussion

There was consensus among the groups that MICE tourism should be the core niche for destination Trinidad. Two of the main reasons cited for this selection were "it already exists, its determinable and quantifiable with trickle down effects'; "it affords the opportunity to provide more business to other niches". There was also some consensus around the three (3) supporting niches. The potential supporting niches identified included Cultural tourism, Ecotourism, Sport tourism and Culinary tourism. All (7) groups identified Ecotourism as a supporting niche indicating that the destination has a competitive advantage in this area given its natural resources. Six of the (7) groups highlighted Cultural tourism given the unique ethnic diversity of the culture in Trinidad as opposed to other islands. Culinary tourism was suggested by (3) groups where the focus was on the diversity of destination Trinidad. Sport tourism was mentioned by (2) groups as a supporting niche because of the recently

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constructed world-class sporting facilities. The following Table provides a summary of the responses to the last (2) questions.

Factors for Consideration	Implementation Measures
Room stock	Staff training
Flight connectivity	Well-developed marketing strategy
Quality of services	Improved incentives
Conference facilities	Improved safety and security
Competitive advantage	Improved insfrastructure

Table 1: Niche Product Selection and Implementation

The approach adopted by the Ministry of Tourism can best be described as a stakeholder-informed or bottom-up approach to niche tourism development. The assumption with this approach is that if the identified niches are to contribute to the sustainable development of tourism in such a way that it benefits the wider society, then individuals in the local society who are directly involved in the management and operation of tourism should have a say in what is considered to be important for the development of the destination. According to Araujo & Bramwell (1999:356), "broad stakeholder involvement has the potential to increase the self-reliance of the stakeholders and their awareness of the issues, facilitate more suitable trade-offs between stakeholders with competing interests, & promote decisions that enjoy a greater degree of 'consensus' & shared ownership". This was evident in this case and there was a high degree of consensus and buy in from the stakeholders involved in the process. This approach also allowed for the inclusion of diverse perspectives and the consideration of issues that can either contribute to or impede the development of the proposed niches. The diverse grouping of the stakeholders enabled the broad consideration of the strategic options indicated by Benur & Bramwell (2015) in their model.

The fundamental challenge with this approach to niche product development is that it is primarily inward-looking. At the outset, the considerations explored by the TSC in the determination of the proposed niches were mainly focused on the destination's strengths with minimal consideration given to external forces. Table 1 highlights the perspectives of the considerations majority stakeholders and the of the focused on internal constraints/opportunities. The relative importance and influence of the external environment on niche product development as noted by Dwyer et al (2009) and Hassan (2000) was not sufficiently explored. SIDS operate in a competitive global environment and thus an examination of the external environment is critical to their sustainability and to ensuring a competitive advantage (Nill and Kemp, 2009).

Conclusion

Trinidad, like many other SIDS, recognizes that niche focused tourism development is critical to survival. The reliance solely on sun, sea and sand for many SIDS and the reliance on Carnival in the case of Trinidad, is insufficient to compete in the global marketplace. It is imperative for SIDS to consider the most appropriate product portfolio based on their relative strengths and constraints going forward. The approach adopted by Trinidad in determining the appropriate niches was too heavily reliant on the perspectives of the stakeholders. For SIDS, a more balanced approach is required that considers both the internal and external environments equally. Moreover, what is critical for SIDS given their resource constraints, which is not addressed in any of the models or considerations, is the ranking of the niches



once identified. Niche identification is the first phase which has to be followed by effective resource deployment to support the proposed developments. It is proposed that in going forward consideration is given to the implementation of a balance scorecard model.

The application of such a model will include expanding the range of variables used in selecting the appropriate niches. A rating score can be applied to the selected variables for evaluating the identified niche products. Based on the tabulated scores an evaluation can be conducted and used to select the best tourism markets/products to diversify into. Most filtering procedures for determining product development do not have a scoring system. A scorecard has a unique feature of adding a quantitative dimension to a qualitative process of niche selection. The scorecard is useful for breaking deadlocks on what niche products to select, develop and invest limited resources.

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Biography

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INVESTIGATION OF THE LEVEL OF LEISURE BENEFITS OF INDIVIDUALS WHO PARTICIPATE PILATES EXERCISES IN THEIR LEISURE

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Abstract

The aim of the study is to investigate of leisure benefits of individuals' who participated in pilates activities. During the data collection, "Rekreasyon Fayda Ölçeği" (Leisure Benefit Scale-LBS) which has been designed by Ho (2008) and was translated to Turkish after the reliability and validity studies by Akgül and Ertüzün (2015) is used. The sample group consisted of 218 participants who participated in pilates activities in Ankara. Individuals' gender variable and frequency of doing pilates per week variable are analyzed with Independent Sample T test, participants' age, percieved income level, having weekly sufficient leisure, constraints of leisure, how long doing pilates exercise variables are analyzed with One Way ANOVA. The Cronbach Alpha coefficient was found to be .91. According to findings; Leisure benefit point is high for this study sample. Participants who were women, in the low income group, who felt that they had insufficient leisure, who had participated in pilates activities for 0-1 years, and 1-2 days per week showed higher leisure benefit score than the other groups. There is no significant difference between age and constraints of leisure benefit levels of individuals.

Key words: Pilates, leisure, leisure benefit, recreation

Main Conference Topic: Sport Science.

Introduction

The term leisure is difficult to define, first because of people's tendency to describe it in highly subjective terms and second because it means different things in different cultures. The latin origin of the word is licere, which means "to permit" or "to allow" (Cordes and Ibrahim, 1996). While leisure is defined as the time remaining after the fulfillment of the requirements of life, the activities chosen by the individual free will lead to a pleasant time to be renewed (Karaküçük, 2008; McLean et all, 2008; Torkildsen, 2005).

Recreational activities are carried out at leisure. Furthermore; recreational activities are called sportive recreation, which is based on recreational use of various sports branches, or a large part of recreational activities. Sportive recreation is based on physical exercise (Karaküçük, 2008; Zorba and Bakır, 2004). Pilates exercises can be shown as an example. Pilates method is much more than a list of exercises. It is a way of connecting and conditioning the whole being-body and mind (Latey, 2001). Pilates is a mind-body fitness program gaining inpopularity and acceptance within the fitness community (Bernardo, 2006). Unlike traditional resistance exercises, which are based on isolating and inserting muscle groups, pilates enables multiple muscle groups to work in coordinated and effective manner in the same movement as an integrated approach (Özdemir and Babayiğit İrez, 2010). The Pilates method was called contrology because it supports the use of the mind on the muscles.





Pilates is an exercise program that focuses on the basic muscles that help keep your biceps in balance and is important in supporting the spine. Breathing exercises are also included (Yıldız, 2014).

This research is designed to investigate the benefits of leisure activities to individuals by pilates activities and to evaluate the benefits of recreation on people in terms of branches and to develop recreation and programs to be organized.

Methods

The sample group of the study was selected through random sampling of 218 participants (177 female and 41 male) who performed pilates exercise in sports halls in Ankara. The "Leisure Benefit Scale LBS" was used by Akgül and Ertüzün, which Ho (2008) developed in the research, adapted to Turkish by making validity reliability study in 2015. The scale has three subdimensions, called physical, psychological, social. Cronbach's Alpha value was .91 in this study. The findings of the research are stated below.

Results

			N=(218)
	Variable	f	%
Gender	Female	177	81,2
	Male	41	18,8
Age	25<	26	11,9
	25-35	91	46,3
	36>	101	10,7
Percieved Income Level	low	38	17,4
	middle	114	52,3
	high	66	30,3
Weekly Sufficient Leisure	insufficient	49	22,5
	normal	115	52,8
	sufficient	54	24,8
Constraints of leisure	always	20	9,2
	sometimes	142	65,1
	never	56	25,7
How long doing pilates exercise	0-1 year	70	32,1
	2-3 year	87	39,9
	4-5 year	46	21,1
	6 year and above	15	6,9
Frequency of doing pilates per week	1-2 day per week	111	50,9
	3-4 day per week	107	49,1

1- The frequency and percentage distribution of demographic variables of participators

Table 1 shows the information about the participants' gender, age, perceived income level, weekly sufficient leisure, constraints of leisure, how long doing pilates exercise, frequency of doing pilates per week variables. According to the collected data, it is observed that 81,32 % of the participants are females, 18,8 % of them are males, and the predominant age group is 25-35 with a rate of 46,3%. When the perceived income status is observed, it is understood that 52,3 % of participants belong to middle income group. Most of the participants use their leisure normal level about sufficient using of leisure with % 52,8 rate.

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Most of the participants have leisure constraints sometimes (% 65,1). Most of them participate the pilates exercises about 2-3 year (% 39,9), and most of the individuals attend to the pilates activities 1-2 days per week (% 50,9).

2- The arithmetic average and standard deviation values of leisure benefit scale and subdimensions

	N=(218)						
	Min.	Max.	$\frac{-}{x}$	SS			
Leisure benefit	24,00	84,00	43,95	11,33			
Physical	7,00	23,00	11,88	3,63			
Psychological	9,00	32,00	17,11	4,68			
Social	9,00	43,00	16,84	5,38			

Arithmetic average and standard deviation value of leisure benefit scale and scale's subdimensions are shown in Table 2. Table 2 shows that a high frequency of leisure benefit (43,95 \pm 11,33) and aggression When subdimension are observed, it was determined that the highest value of arithmetic average is in psychological subdimension (17,11 \pm 4,68), and the lowest value of arithmetic average is physical subdimension (16,84 \pm 5,38).

	Gender	Ν	\overline{x}	SS	t	р
Leisure benefit	male	177	42,63	10,80	-3,660	0,00*
	female	41	49,63	11,95		
Physical	male	177	11,56	3,52	-2,788	0,00*
	female	41	13,29	3,80		
Psychological	male	177	16,75	4,61	-2,398	0,01*
	female	41	18,68	4,70		
Social	male	177	16,16	4,83	-4,007	0,00*
	female	41	19,78	6,61		

3- The results of t test between leisure benefit and subdimensions of leisure benefit scale and gender variable

*p<0,05 is statistically significant.

In the table 3; there is a statistically significant relationship between leisure benefit and gender variable. This finding shows that female participants have more leisure benefit than male participants in total points and in all subdimensions.

4-The results of ANOVA among leisure benefit scale and subdimensions of leisure benefit scale and percieved income level variable

	Percieved Income	Ν	\overline{x}	Ss	F	Р
Leisure benefit	low	38	49,97	9,193	7,118	0,00*
	middle	114	43,14	11,26		
	high	66	41,89	11,56		
	total	218	43,95	11,33		
Physical	low	38	13,71	3,27		
	middle	114	11,87	3,50	7,883	0,00*



	high	66	10,86	3,68		
	total	218	11,88	3,63		
Psychological	low	38	19,55	4,09	6,661	0,00*
	middle	114	16,47	4,67		
	high	66	16,83	4,63		
	total	218	17,11	4,68		
Social	low	38	18,84	3,98	3,596	0,02*
	middle	114	16,67	5,74		
	high	66	15,98	5,21		
	total	218	16,84	5,38		

*p<0,05 is statistically significant.

According to ANOVA results; There is a significant difference between the low, middle and high percieved income level and leisure benefit. According to this result; in total points and in all subdimensions the highest leisure benefit point is observed in low income level and the lowest leisure benefit point is shown in high income level.

5-The	results	of	ANOVA	among	leisure	benefit	scale	and	subdimensions	of	leisure
benefi	t scale a	nd s	sufficient	leisure v	variable						

	sufficient leisure	Ν	\overline{x}	Ss	F	Р
Leisure benefit	insufficient	49	52,20	10,26	19,668	0,00*
	normal	115	41,37	10,43		
	sufficient	54	41,96	10,73		
	total	218	43,954	11,33		
Physical	insufficient	49	14,42	3,39		
	normal	115	11,23	3,31	17,965	0,00*
	sufficient	54	10,98	3,48		
	total	218	11,88	3,63		
Psychological	insufficient	49	20,10	4,07	15,272	0,00*
	normal	115	15,96	4,62		
	sufficient	54	16,87	4,20		
	total	218	17,11	4,68		
Social	insufficient	49	19,97	5,59	11,781	0,00*
	normal	115	15,92	4,88		
	sufficient	54	15,96	5,21		
	total	218	16,84	5,38		

*p<0,05 is statistically significant.

As seen in the table 5; participants' leisure benefit score is statistically significant in total point and in subdimensions. According to this; the lowest leisure benefit score is shown by participants who considered their leisure as sufficient. The participants have the highest point is in insufficient leisure.



Conclusion

According to our research findings, participants had a high level of leisure benefit and had the highest score in the psychological subdimension. From the findings of our research, we can say that the leisure benefit level is more psychological for the individuals who deal with pilates for this sample. Heintzman (2009) also found that, in parallel with our research, the level of leisure benefit affected the participants more psychologically. Furthermore; In parallel with our research results, Chao et al. (2013) observed that the participant showed high leisure benefit score in his research with 3015 participants. Beside that, Philipp (1997) found that male participants had higher levels of leisure-time benefits, in contrast to our research.

In some different studies; Lina et al. (2013) stated that recreational benefit level is positively related to life satisfaction. Kuo (2013) has also reached the conclusion that the level of leisure benefit affects the quality of life. On the other hand; Shyu (2012) found that leisure constraints had a negative effect on leisure benefit level.

As a result of the study, leisure benefit points is high for this study sample. Participants who were women, in the low income group, who felt that they had insufficient leisure, who had participated in pilates activities for 0-1 years, and 1-2 days per week showed higher leisure benefit score than the other groups. There is no significant difference between age and constraints of leisure variable and leisure benefit scale. As a result, it can be said that pilates activities have positive effects on leisure benefit levels of individuals. In our country, a large number of leisure benefit researches can be expanded and implemented, and different recreative programs can be developed by analyzing the data obtained from the participants. Moreover, researches can be done by increasing the number of participants with different sampling groups.

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Brief biographies of the authors

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DETERMINATION OF THE METAPHORICAL PERCEPTIONS OF SPORTS SCIENCE FACULTY STUDENTS' TOWARDS SPORTS CONCEPT

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Abstract

The aim of this research is to determine the perceptions of the students who are studying at the faculty of sport sciences in Turkey. The study sample contains of 44 sports science faculty students. In order to collect data in the research, a "metaphor form" was prepared to determine the perceptions of the students about the concept of sport. Students are asked to complete the sentence "Sports is like...; Because..." in the metaphor form. In the research, a qualitative research approach and phenomenology design was used. In the analysis of the data content analysis technique was used. For the reliability of the analysis of the research data, the inter-participants reliability factor was calculated and found to be 94%. By evaluating the data, it was observed that sports science faculty students produced 34 metaphors in total. These metaphors produced are collected in 7 different categories. While it has been determined that students have developed metaphors in the category of "contribution to health" (14 metaphors), these have followed the categories in terms of "necessity", "diversity", "affective imagery", "continuity", "addiction" and "socialization tool", these have followed respectively. As a result, it has been determined that students of sports science faculty express the concept of sport by means of metaphors in a very fertile and diverse way. Therefore, the metaphors identified in this study are based on the Constitution of the Republic of Turkey "The State takes measures to improve the physical and mental health of Turkish citizens of all ages, encourage the dissemination of the sport to the masses and the state shall protect the successful athlete "and may lead to the actions responsible for the administration and administration of the sport in the course of its implementation.

Key words: Sports, sports science faculty, metaphor, qualitive research method.

Main Conference Topic: Sport Science.

Introduction

Sports word; was born of Latin words of disportare or deportare (Inal, 2003). It is expressed as all of the acts performed according to some rules, carried out individually or collectively, to develop the body or mind (TDK, 2005). It has great proposition for physical, psychological and social development of the individual. In sporting events, according to qualities, sometimes play, sometimes performance, sometimes health, sometimes adventure can gain priority. Priorities may vary according to the age, purpose and characteristics of the person doing the sport (Demirhan, 2006) and perceptions about the spore may vary from person to person. From this point of view, what the concept of sport means for each individual and how this view point and perception of understanding is the basis of research.

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Method

Model of Research

In this research conducted to determine the perceptions of the sport concept of the students who are studying in sports science faculties in Turkey, the qualitative research approach which provides the in-depth and detailed information is used (Yıldırım and Şimşek, 2011:40). The study design that is preferred in the frame of the research is the phenomenology design. In this study, the perceptions of the students of sport sciences on the concept of sport were determined through metaphors.

Research Sample

This research has been conducted with the students who are studying at the faculty of sport sciences in Turkey. A total of 44 students took part in the study. In this study, a study group was selected according to the purposeful sampling method. In the selection of the study group, criterion sampling was used for purposeful sampling methods (Büyüköztürk et al., 2009), which allow for the in-depth research by selecting fertile situations in terms of information depending on the purpose of the study.

As a criterion;

- Students studying at sports faculties of universities

- Criteria such as the voluntary participation of students to work are taken into consideration.

Data Collection Tool

In this study, a "semi-structured interview" form was used, which gives participants the opportunity to freely express their thoughts on a particular topic. In this context, each participant is required to write a metaphor describing the sport and explain it. In order to determine the mental imagery of the sports concept students of the sports science faculty, each student is asked, "Sports is like..., because ..." and as a result it was determined that the participants indicated the only metaphor and explained these metaphors.

Analysis of Data

To begin the analysis of the data, the respondents' response papers were first numbered 1 through 44. In this study, content analysis was used from data evaluation methods used which is used in researches in social areas. Content analysis is the process of identification, coding and categorization of data (Patton, 2014).

Validity and Reliability

In the process of achieving validity and reliability; Attention has been paid to the validity of the results of the research "to report in detail the collected data and to explain how the researcher reaches the results" (Yıldırım and Şimşek, 2014). For this purpose, the analysis process and how the resulting codes are related to the categories are presented to the reader directly with participant expressions.

In order to ensure the reliability of the research, The data were analyzed by two field experts to determine whether the conceptual categories reached as a result of the data analysis represent the acquired themes; The codes obtained and the categories represented by the codes are compared (Y1lmaz and Güven, 2015). The reliability of the data analysis made in this way is calculated using the formula [Consensus / (Consensus + Dissidence) x 100] (Miles and Huberman, 1994). A total of 34 metaphors were produced in the study, and 2



metaphors (ungrateful beloved, female) with a viewpoint were identified. The average reliability of the encoders was found to be 94% $[32 / (32 + 2) \times 100 = 94\%]$. This result shows that the desired level of reliability in the research has been achieved.

Results

This section presents the metaphors developed by students of the sport science faculty on the concept of sport, the evaluation and explanations of these metaphors under the relevant categories.

Table 1. The Metaphors of the Students of the Faculty of Sport Sciences Developed for the Sport Concept

Metaphor sequence	Name of metaphor	f	Metaphor sequence	Name of metaphor	f
1	Live	7	19	Window	1
2	Breath	4	20	Book	1
3	Medicine	2	21	Rainbow	1
4	Garden	1	22	Litmus paper	1
5	Tree	1	23	Норе	1
6	Support arm for life	1	24	Freedom	1
7	Doctor	1	25	Love	1
8	Therapy	1	26	Crush	1
9	Relief tool	1	27	Tool	1
10	April rains	1	28	Flowing water	1
11	Music	1	29	Ungrateful beloved	1
12	Fundamental needs	1	30	Human	1
13	Food	1	31	Passion	1
14	Water of life	1	32	Drug	1
15	Water	1	33	Woman	1
16	Blood	1	34	Prestige	1
17	Bough	1			
18	Never ending gain	1		TOTAL OPINIONS	44

When Table 1 is examined, Sports science faculty students have produced a total of 34 types of metaphors for the concept of "sports" and 44 of them have expressed opinions. Life (7), Breath (4), and Drug (2) metaphor were the most frequently repeated metaphors. In order to be able to explain the concept of sport, the students made simulations of intangible (Therapy, Breath, Freedom etc.) and concrete (tree, food, water, etc.) expressions.

The classification of sports science faculty students into 7 categories in terms of their common characteristics, taking into account the reasons / explanations of the metaphors developed by the sport, is presented in Table 2.

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Categories		Number of metaphors (f)	%
1. In terms of contribution to health		14	31,81
2. In terms of necessity		10	22,72
3. In terms of diversity		5	11,36
4. In terms of affective imagery		5	11,36
5. In terms of continuity		4	9,09
6. In terms of addiction		4	9,09
7. In terms of being a socialization tool		2	4,54
	TOTAL	44	100.0

Table 2. Distribution of the Metaphors Developed by Students of the School of Sports Sciences by Categorical

According to Table 2, the metaphors developed by sport science students for the sport concept are grouped under 7 categories. These are; *In terms of contribution to health* (14-31.81%), *in terms of necessity* (10- 22.72%), *in terms of diversity* (5- 11.36%), *in terms of addiction* (4- 9.09%) and *in terms of being a socialization tool* (2-4.54%).

Metaphors in the categories identified in Table 3 through Table 9 and examples of explanations for metaphors are included.

Table 3. Examples of Metaphores and Explanations in the Category of "In Terms of Contribution to Health"

Category	Number of Metaphor (f=14)
1. In Terms of Contribution to Health	Life (4), Medicine (2), Doctor (1), Therapy (1), Support arm for life (1), Tree (1), Garden (1), Relief tool (1), April rains (1), Music (1),
Outlines the explanatory examples of university students; Life: It is the source of living in a healthy way (K11)	
<i>Medicine;</i> It is necessary for our physical and mental health.(K9)	

Doctor; Because the doctor heals the patient.(K4)

April Rains; It gives serenity and make the one feels good. (K13)

As shown in Table 3, a total of 14 metaphores have been indicated in the category of "in terms of contribution to health" regarding the concept of sport. As can be seen from the examples in the explanatory notes for the metaphors; It is observed that the students of the sports science faculty are focusing on the sports health dimension.

Table 4. Examples of Metaphors and Explanations in the Category of "In Terms Of Necessity"

Category	Number of Metaphor (f=10)	
2. In terms of necessity	Breath (4), Food (1), Fundamental needs (1), Life (1), Water (1), Water of life (1), Blood (1)	

Outlines the explanatory examples of university students; Breath; 12 years of labor is as important as breathing. As much as bread, it's as valuable as water . (K16) Food; Sports are as important as food because we can keep our vital activities going smoothly. (K19) Blood; Life without sport is like a bloodless vessel. Sports is a must in every field of our life.(K24) Water of life; How can the flower not be thirsty, when it dries up and shrinks day by day, the person who does not do sports becomes unable to survive for years. (K21)



When a total of 10 metaphors indicated in the category "in terms of necessity e" are examined in Table 4, it is seen that the students have developed metaphors with the vital importance of sports.

Table 5. Examples of Metaphores and Explanations in the Category of "In Terms Of Diversity"

Category	Number of Metaphor (f=5)
	Bough (1), Never ending gain (1), Window (1), Book (1), Rainbow (1)
3. In Terms Of Diversity	

Outlines the explanatory examples of university students;
Bough; Each branch actually has common features such as discipline, self-confidence and competition . (K25)
<i>Never ending gain;</i> It develops the person from every side.(K26)
Window; It opens up the doors of different lifetimes and environments to us . (K27)
Rainbow; It develops different areas of individuals. (K29)

As shown in Table 5, there are a total of 5 metaphors in the category "in terms of diversity" regarding the concept of sport. As understood from the explanations given for each metaphor; Students develop the people from all sides, open the door of different lives to us, and so on. It is understood that sports have developed metaphors that show diversity in the act of explanation.

Table 6. Examples Of Metaphors And Explanations In The Category ''In Terms Of Affective Imagery''

Category Number of Metaphor (f=5)		
	Hope (1), Freedom (1), Love (1), Crush (1), Litmus paper (1)	
4. In Terms Of Affective		
Imagery		
Outlines the explanatory examples of university students;		
<i>Hope;</i> When you feel unhappy, desperate, it gives you strength to live again . (K31)		
<i>Freedom;</i> The feeling that increases as you do sports is like freedom.(K32)		
<i>Love;</i> It connects you to life and makes you realize the features that make you . (K33)		
Crush; It revives beautiful feelings. It is even more beautiful than love because it does not hurt. (K34)		

As shown in Table 6, there are a total of 5 metaphors in the categorized "In Terms Of Affective Imagery" of the sport concept. Except in this category, intangible (hope, freedom, love, crush) metaphors are mentioned.

Table 7. Examples Of Metaphors And Explanations In The Category "In Terms Of Continuity"

Category	Number of Metaphor (f=4)	
	Flowing water (1), Tool (1),	Ungrateful beloved (1), Human (1),

5. In terms of continuity

Nankör sevgili; You leave him one day, he will leave you for ten days. (K37)

Outlines the explanatory examples of university students;

Flowing water; The continuity is very beneficial. (K36)

Tool; Sports affects and changes the confidence, physical characteristics, environment and living conditions of a person positively.(K35)

As shown in Table 7, a total of 4 metaphors are indicated in the category "in terms of continuity" regarding the concept of sport. Sports are described with live (Human, Ungrateful beloved) and inanimate (Flowing water, Tool) metaphors.

Table 7. Examples Of Metaphors And Explanations In The Category "In Terms Of Addiction"

Category	Number of Metaphor (f=4)
	Passion (1), Drug (1), Life (1), Woman (1),

6. In Terms Of Addiction

Outlines the explanatory examples of university students;
Drug; It's addictive. When drugs are released, there are troubles, and when sports are left, injuries come to fruition. (K40)
Life; I feel uncomfortable if I do not sport in certain times of the week. (K41)
Woman; It's not so easy to start and go back to where you left off. (K42)

As shown in Table 8, there are a total of 4 metaphors in the category of "in terms of addiction" in relation to the sport concept.

Table 7. Examples Of Metaphors And Explanations In The Category "In Terms of Being a Socialization Tool "

Category	Number of Metaphor (f=2)	
	Life (1), Prestige (1),	
7. In Terms Of Being a Socialization Tool		
Outlines the explanatory examples of university students;		

Life; Sport affects all our relationships in our lives.(K43) *Prestige;* People need to do sports to improve their status and gain respect. (K44)

As shown in Table 9, a total of 2 metaphors have been indicated in the category "in terms of being a socialization tool" regarding the concept of sport.



Conclusion

In this research, it was aimed to determine the perceptions and metaphors of the students who are studying at the faculty of sports sciences in Turkey. According to the results obtained, perceptions of the students regarding the concept of sport were interpreted.

Sports science faculty students have produced a total of 34 metaphors related to the sport concept. These metaphors produced are collected in 7 different categories. While it has been determined that students have developed metaphors in the category of "in terms of contribution to health" (14 metaphors), the categories are followed "in terms of necessity", "in terms of diversity", "in terms of affective intentions", "in terms of continuity", "in terms of addiction" and "in terms of being a socialization tool".

Participants were found to have statements such as "healing the patient like a doctor about sports" in the category "in terms of contributions to health" where the greatest amount of metaphors were produced.

In parallel with our study, it was determined that Koç and his colleagues (2015) made primary school students to determine the metaphorical perceptions of the concept of sport when a large majority of the students regarded sports as a healthy living tool. Also, it is determined that Aydoğan and his colleagues (2015) is done similar results to our research study on pre-school children's sports perceptions.

Participants were noted in the other categories that sports are important as breathing, they are developed from every side, they liberate individuals, they help with socializing with other people, and finally they have difficulty in starting again when they are left as an addictive person. Studies in the literature support this situation (Fişek,1998; Karaküçük, 2008; Yetim, 2015; Zorba, 2010).

Both live metaphors (tree, doctor, human, woman, etc.) and lifeless metaphor (medicine, threapy, window, book, etc.) All used metaphors except of "ungrateful beloved" and "drug" are all positive.

As a result, it has been determined that students of sports science faculty express the concept of sport by means of metaphors in a very fertile and diverse way. Therefore, the metaphors identified in this study are based on the Constitution of the Republic of Turkey "The State takes measures to improve the physical and mental health of Turkish citizens of all ages, encourage the dissemination of the sport to the masses and the state shall protect the successful athlete "and may lead to the actions responsible for the administration and administration of the sport in the course of its implementation.

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Examining The Effects Of Transportation Planning On Social Exclusion Through Shopping Malls – The Example Of Konya

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Abstract

Shopping malls have become the 'new urban squares' where social life is experienced, vacant time is spent through various activities offered and societal integration is happened. Transportation planning has a big role in shopping malls providing equal opportunities to individuals from every walk of life.

While transportation is the most important factor for accessing to urban activities, it is the primary factor that causes social exclusion. Refining and improving public transportation in accessing to urban functions increases the use of urban functions, as well as contributes to the prevention of social exclusion by providing equal opportunities to everyone in the society.

In this study, the purpose is to provide equal access opportunity to everyone by increasing the use of public transportation vehicles in accessing to shopping malls and by improving these systems, and ultimately reducing the effects of social exclusion originating from transportation planning. In this study, three shopping malls in the city of Konya (Kule Site, Kent Plaza, Novada) has been selected as samples. The shopping malls being in the walking distance (500 meters) to rail systems and having easy access facilities to the city center has been influential in choosing the sample location. In order to identify the social exclusion originating from urban transportation planning, observations at the sample locations and interviews with the individuals using the shopping malls have been carried out. In the vocal interviews, in order to identify the transportation habits of the individuals using the shopping malls, they were asked which means of transportation they prefer, for those who are dependent on private vehicle, which facilities should be provided for them to prefer public transportation was asked. As a result of the evaluation of the derived data, suggestions were made towards reducing social exclusion in the use of shopping malls through increasing public transportation.

Keywords: urban transportation planning, public transportation, social exclusion, shopping malls, Konya

1. Introduction

Shopping is a commerce-oriented social activity, which emerged with mutual interest relationships between people established in order to meet their vital need (Sayılı, 1992).

The act of shopping produces the act of interactive consumption by people gathering in certain locations of their cities, as a result of their social aspects (Ülker, 1999). In this context, the phenomenon of shopping has evolved in accordance with the needs of people for

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years, and has become an effective factor in the formation of cities, and especially the shopping locations.

Population, that increased with the industrial revolution and the urbanisation phenomenon accordingly, industrialization along with the opportunities provided by the technology, led the consumption society and the investors to search for different environments on the basis of shopping act. The studies to increase comfort and the satisfaction of people as they shop at malls, which aim at attracting customers using the attraction and prestige of the shops brought together have gathered momentum. Private and individual efforts, such as creating traffic free streets or protecting shop fronts from climatic conditions accordingly, contributed to the formation of modern malls (Barlas, 2010).

Malls, defined as the presentation of a group of retail and commercial enterprises in a certain location, with the solution of parking problem in the same location, are the artificially enhanced forms of classical markets (Barlas, 2010).

Shopping centres, which included various activities and defined as public areas before the industrialization period in cities, are today no longer public areas where all residents of the cities have easy access and perform the activities they wish (Kılıç, Aydoğan, 2006).

Today malls are not only areas where commercial activities are carried out in the cities, but also places where social activities are conducted and free time is spent. For this reason, for the malls to be able to provide all residents of cities with equal opportunities, they should be located in places of high accessibility and social exclusion should be prevented this way.

Transportation is both the most important factor in access to urban activities, and also the element results in social exclusion. Enhancement and development of mass transportation systems for access to urban functions increase the use of urban functions and additionally contribute to the prevention of social exclusion by providing every member of societies with equal opportunities. For this reason; in order to prevent social exclusion in malls, users should have easy access as pedestrians, through mass transportation means and private vehicles, and the place should be in contact with transportation channels (Kademoğlu, 2011).

Shopping malls that address to different user groups can prefer locations either in urban centres or fringes. Malls in centres may have heavy traffic load and parking issues in terms of transportation, despite their central locations. However, due to their easy access through mass transportation means, malls in centres are used more heavily. Malls in the centres with high accessibility provide every segment of society with access in any time period (Ersoy, 2006, Birol, 2005).

Because there aren't enough spaces in centres for malls that require wide space due to increasing population in the cities, malls can be built in locations in outer parts of the cities, where access is easier and can attract users from other peripheral centres. However, malls built with the idea that they can be used by people from peripheral centres and city centre, may become places which can only be used by people who have private vehicles or walk from residents around. Because the integration of these malls, which are built close to developed highway systems, with mass transportation isn't taken into consideration, generally they can only address to private vehicle owners (Topçu, 2011; Timor, 2004; Ünlükara and Berköz 2016).

The break of social bonds and the difficulty in integration to society as a result of the prevention from participation in social processes form the basis of the definition of social exclusion. Social exclusion, which refers to deteriorations in social bonds and general disadvantage according to Dean (1991), is defined as the inability to take part in economic, social, political and cultural life, alienation and being away from the society. In general terms, social exclusion refers to the inability to have access to civic, political, economic and social rights, which integrate individuals with the society, by some individuals and groups (Duffy, 1995; Walker and Walker, 1997).

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According to De Haan, the most important reason of social exclusion is not providing all individuals and groups in a society with the access to the phenomenon accepted as the society totally, or with not full potential (De Haan, 1998).

David Smith, who emphasized the importance of social exclusion in urban areas, coined the concepts of "human poverty" and "place poverty" in late 1970s, and claimed that human poverty wasn't resulted from the place they lives but the natural structure of the society. What is specifically emphasized here is the disadvantaged state of not individuals but the place and therefore the lack of transportation/access (Özkazanç, Sönmez, 2015).

Due to its direct effect on the access to urban functions, transportation is top ranked in the list of reasons for social exclusion. Access and participation of all segments of the society in services should be as important as the location preference of urban services. In order to prevent social exclusion, transportation must be enhanced with the studies on social integration and increasing social participation. Recent studies on decreasing social exclusion have presented the relationship between social exclusion and transportation, and have focused on the prevention of spatial disadvantage in access to services (Özkazanç, Sönmez, 2015).

In order to define social exclusion resulting from transportation in malls, the present study examines three malls (Kule Site, Kent Plaza, Novada) that are placed in the urban centre and fringe.

The main purpose of the present research is examining social exclusion in malls resulting from transportation, and developing suggestions to provide every member of the society with equal rights to prevent social exclusion. Within the scope of the research, observations were conducted in sample areas, and interviews were conducted with the users of malls, in order to define the social exclusion resulting from urban transportation planning. During the interviews, the interviewees were questioned about the type of transportation they used to reach the mall, and the ones who depended on private vehicles were asked in which case they would prefer mass transportation if they were provided with. With the findings obtained through the analysis of collected data, suggestions were developed for decreasing social exclusion in mall use. It is believed that findings obtained and suggestions developed within the scope of the present research can contribute to decreasing social exclusion by increasing accessibility of shopping malls.

2. Material and Method

The material of the present research consists of three malls selected among the ones in Konya.

- ✓ Kule Site Shopping Centre
- ✓ Novada Shopping Centre
- ✓ Kent Plaza Shopping Centre

Observations were carried in the sample areas, locations, their environment and transportation facilities of the malls were studied, detailed interviews were conducted with local governments and users of the malls were interviewed.

3. Research Findings

•Kule Site Shopping Centre

Kule Site Shopping Centre, which came into service in 2004, is located in the north of Konya about 3 km from city centre. According to the observations carried in the area, there are heavy housing zones around, wholesale trade areas and a hospital in the northeast, a hotel and banks in the east, and highly populated housing zones in the west and south of the malls. The mall can be accessed via Ahmet Hilmi Nalçacı Avenue, which is one of the

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most important transportation arteries of Konya, from the east, and Kerkük Avenue from the west. Additionally, the mall can be easily accessed with mass transportation means, such as tram, shared taxi and bus (Image 1).



Image 1: Kule Site Shopping Centre and Its Surroundings

According to the interviews with mall users carried in 2016, most of the users get to the mall via mass transportation vehicles, they don't have any accessibility problems, yet the pedestrians may have traffic security problems in the heavy traffic. Most of the interviewees, who reported that they got to the mall with their private cars, stated that they didn't prefer to go to the mall in the evenings and at the weekends, because they had to wait long in the heavy traffic, and had parking problems during these times. Most of the users of the mall stated that they could get to the mall during the day any time they wished and they didn't have any social exclusion problems.

Mass transportation lines to the mall were investigated and accordingly, there are seven bus lines, six shared taxi lines and one tram line to the mall (Anonymous 1,URL 1).

•Konya Kent Plaza Shopping Centre

Konya Kent Plaza Shopping Centre, which came to service in 2012, is located approximately 5 km away from the city centre. With the observations carried in the area, it was found that Kent Plaza Shopping Centre has similar characteristics with Kule Site Shopping Centre. Around Kent Plaza Shopping Centre, there are highly populated housing zones in the west, and the Organized Industrial Zone in the west. Additionally, on the east of Kent Plaza Shopping Centre is, Yeni İstanbul Avenue, which is one of the 1st level transportation arteries of Konya, and the tram line (Image 2), (Anonymous 1, URL 1).



Image 2: Kent Plaza Shopping Centre and its Surroundings



Mass transportation lines to the mall were investigated and accordingly, there are nine bus lines, five shared taxi lines and one tram line to the mall (Anonymous 1, URL 1) (Anonymous, 25.06.2016). Accordingly, the mall is highly accessible through mass transportation for the users.

Users of Kent Plaza Shopping Centre were interviewed, and the interviewees, who stated that they got to the mall via mass transportation, reported that they can access to the mall easily at any time of the day, and the pedestrians reported that they experienced pedestrian security issues due to heavy vehicle traffic and limited pedestrian crossings. Additionally, the users, who stated that they got to the mall with their private vehicles, reported that they experienced traffic security issues in the heavy traffic due to the industrial areas around the mall.

•Konya Novada Shopping Centre

Novada Shopping Centre, which came to service in 2015, is located in Selçuklu central district, Sancak quarter of Konya, which is the developing area of the city. Around the mall is located the intercity bus station and developing housing zones (Image 3). There are four bus lines and one shared taxi line that serve for the accessibility via mass transportation to the mall, which is located approximately 15 km away from Konya city centre (Anonymous 1, URL 1) (Anonymous, 25.06.2016). Observations were conducted in the area, and accordingly the tram line is near the mall, however due to lack of secure pedestrian zone to the mall from the tram stop, mass transportation is inadequate. The mall uses customer shuttle vehicles in order to solve accessibility problems, but because they run in a limited route, they cannot address to whole city residents.



Image 3: Novada Shopping Centre and its Surroundings

Interviews were carried with Novada Shopping Centre users, and it was found that the mall was mostly preferred by private vehicle owners; and the users, who stated that they got to the mall with mass transportation, resided in the immediate environment. Most of the interviewed users of the mall reported that they couldn't use the mall in any desired time period due to accessibility problem, the mall mostly addressed to private vehicle owners, and it didn't provide every segment of the society with equal rights and therefore there was a transportation oriented social exclusion in the mall.

4. Evaluation and Suggestions

In today's environment of competition, increasing with globalisation, malls need to provide every individual in the society with equal rights and opportunities to be able protect and increase their share in the market. Increasing accessibility to malls, which emerge as places of both commercial activity and leisure activity, where people can socialize and spend

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their free time, will contribute to the increasing of their shares in the market by expanding the mass they address to and additionally will contribute to the prevention of social exclusion by providing every member of the society with equal rights.

Social exclusion, which is defined as the lacking the qualities required by the new relationships with the development of technology, inability to include with the society and to use of social facilities, is experienced by more and more people in the society everyday, and makes people loose the sense of belonging, experience sense of loneliness and so threatens every segment of the society.

The present research studies the existence of transportation oriented social exclusion in modern malls in Konya. According to the evaluation of the findings obtained in the present research, it can be stated that;

For the malls in the city centre of Konya (Kule Site Shopping Centre, Kent Plaza Shopping Centre),

• Mass transportation is adequate, and they are highly accessible through mass transportation,

• Due to lack of arrangements for pedestrians in the heavy traffic, there is no pedestrian security and users don't prefer to get to these malls on foot,

• There aren't any arrangements and cyclist security for cyclists in the heavy traffic in their environment, so it is not secure for cyclists, therefore they cannot address to the cyclists,

• Due to parking problems especially at the weekends, private vehicle owners don't prefer these malls during these time periods,

• At the malls in the city centre, there is no social exclusion for mass transportation users, however pedestrians and cyclists experience social exclusion due to security problems in the heavy traffic in the areas.

For the malls outside the city centre of Konya (Novada);

•Access to the mall through mass transportation is limited,

• There are no connections from the tram stop, which is not very far from the mall,

•Because the mall is far from the city centre, access on foot or cycling is not an option,

•Despite the private shuttle vehicles provided by the mall, they cannot address to all residents of the city as they run on a limited route,

•Access to the mall is mostly done via private vehicles,

•Users who don't have private vehicles, and need public transportation cannot get to the mall in any desired time due to social security problems,

•The mall outside the city centre mostly addresses to private vehicle owners, and the individuals, who don't have private vehicles, experience transportation oriented social exclusion at this mall.

According to the evaluation of the findings of the present research conducted in the area, transportation planning oriented problems play an important role in social exclusion. The suggestions developed for the prevention of transportation planning oriented problems are as follows;

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•Mass transportation systems should be developed and their extent should be expanded in order to increase the accessibility of the malls, which are needed by every individual living in cities with the transition to modern life,

•Around the malls, secure pedestrian zones should be created for the users who want to get to the malls on foot,

•Secure cycle lanes, and bike parks should be built for the users who want to get to the mall cycling,

•Considering that malls address to needs of individuals at any time of the day, social security should be provided around the malls,

•Adequate parking spaces should be built for the users who prefer their private vehicles to get to the malls,

•Considering the heavy traffic in the city centre, entrances to the malls should be provided at spots, where the entrance won't create extra traffic problems,

•While choosing the location of mall, land use policies of the cities should be taken into consideration and malls shouldn't add over the capacity vehicle load in the important transportation axes of the cities.

Transportation planning in malls, which are important commercial and social areas of the cities, emerges as an important factor of social exclusion. For this reason; the environment, economy and the society should be taken as a whole, land use policies should be made in accordance with transportation plans, and every member of the society should be provided with equal rights in order to prevent social exclusion.

We should keep in mind that; "liveable public areas for everyone" perception should be the focus of urban planning during urban area production stage to avoid social inequality and prevent social exclusion accordingly.

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Culture, Identity and Tourism: An Evaluation of Cultural Tourism Potentials of Şirince (Turkey)

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Abstract

Historic environments which sustain their cultural continuity and protect their unique characteristics are special places, due not only to their cultural heritage but also to their identity. Identity is linked to culture and lifestyle, and in this context, the character and meaning of a place are the significant components of identity in the cultural landscape which contribute to cultural tourism potentials. Şirince is one of the unique settlement in Aegean region of Turkey. Its history goes back to the early years of Ephesus, which is an ancient settlement of Second Century B.C. Turks and Greeks lived together in this region until the population exchange of 1923 resulted in the migration of Turkish farmers from Kavala and Tessaloniki to Şirince. Its natural environment, historical architecture, cultural richness and socio-cultural life provide place identity and contribute to cultural tourism potentials. This research aims to assess the natural, built and socio-cultural features constituting the identity of the Şirince in terms of cultural tourism and to define development strategies that are intended to evaluation of these potentials

Keywords: culture, identity, cultural tourism, Şirince. **Main Conference Topic:** Tourism

Introduction

In recent years, the mass tourism based on sea-sand-sun has started to give its place to other tourism types such as eco-tourism, rural tourism, belief tourism and cultural tourism in which seeing and living the natural, historical and cultural assets gained importance. This choice indicates that desire to see different cultures is the main factor for the people to take a trip.

Cultural tourism is defined as the movement of persons to a place other than their residence in order to visit historical, artistic, scientific values or lifestyle/cultural heritage of a society, region or a group (Silberberg, 2001). Cultural tourism should not only bring economic benefits to host communities, but also provide an important means an motivation for them to manage their heritage and continuing traditions. In addition, co-operation between the stakeholders is necessary to achieve a sustainable cultural tourism industry and enhance to protection of cultural heritage for future generation (ICOMOS,1999). It could be said that in the current millennium, with the awareness that especially local identities and cultural features constitute a common world heritage, cities seek for planning approaches based on development strategies called "value marketing" by conserving, sustaining and developing cultural values by means of cultural tourism policies (Ashworth, & Tunbridge 1990, Orbaşlı, 2000, Nasser, 2003).



There is a strong relationship between cultural tourism and urban identity. Urban identity is formed by the effects of interaction with the natural and artificial environment (Raja, 2003; Padua 2007). For this reason, the presence of a unique identity results from the morphological features constituting the natural and built environment of the city and the values symbolized by the people living in the cities as well as the people, events and monumental structures leaving a mark on the city's history (Bilsel et al. 2000).

Oktay (2006) highlighted that, identity is related to characteristics of an area not only geographically, but also historically, socially and in particular aesthetically. Genius loci – the spirit of a place, buildings, network of spaces, revealing views to landmarks or glimpses to secluded alleys and courts, the pattern of uses and activities and emotional attachment shape character of the settlement. So, these characteristics, which constitute the identity, are an attractive element of cultural tourism. Besides these, unique architectural texture, lifestyle, culinary culture, archaeological area and historical buildings, art and handicrafts constitute the most important elements of cultural tourism.

Turkey has a rich cultural and natural heritage displaying the overlap of different cultures and the effect of this variation on space with the deep-rooted characteristics of its history. Like Safranbolu, Cumalıkızık and Beypazarı, Şirince is one of the most important traditional settlement in terms of historical and natural resources constituted unique identity in Turkey. Sirince is an important cultural tourism destination with its authentic architectural texture and historical buildings, culinary culture and wine production in our day. It is located about 8 km from Selcuk town and is inside of the important touristic geography with its location. It's closeness to Ephesus, Kusadasi and some ancient cities are known all over the world. The Aegean Region of the country has a strong integration of these important touristic centers. The majority of the local and foreign tourists who visit Ephesus and Selçuk are coming to Sirince with daily tours, and it is the most important indicators of this integration (Semenderoğlu, & Oban, 2007). In this context, the main purposes of this study are to assess natural, built and socio-cultural characteristics of Sirince that constitute the identity of the village in terms of cultural tourism, with reference to the findings of analytical research process carried out in the traditional settlement, and to define development strategies that are intended to evaluation of these potentials.

Spatial Characteristics of Şirince

Şirince which is situated 350-400 meters above sea level in Aegean region of the country is about 8 km far from Selcuk town (Figure 1). The fact that Şirince has housed many different cultures with its characteristics of the geographic region in which it is located has enriched the cultural heritage of the settlement. The village has settled in a valley and its geographical position, residential architecture and typology of the urban pattern play an important role in forming cultural landscape and local identity and they make Şirince as a unique place. Dido Satiriyu (1970) described the authenticity of the settlement in her famous novel as *"the village as a corner of the paradise on earth which is situated on the top of a lush green hill overlooking Ephesus plain stretching all the way to the turquoise Aegean Sea"*.

There are a lot of stories about the history of Şirince. According to one of them, when the village established in Küçük Menderes Basin and became uninhabitable due to the flood disasters, the Greek Cypriots came to the foothills of the mountains where they thought it was safer and founded the "Kırkıca Village" known as "Ephesus on the Mountain" (Bolat, 2007).

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The date of the settlement is not clearly known as the period of the remains inside and around the settlement can not be determined but written sources and some remains point that Şirince's history goes back to the early years of Ephesus, which is an ancient settlement of Second Century B.C. (Tül, 2008).



Figure 1 Location of Şirince in Turkey

The residents named this beatiful settlement as "Ugly Village". This name helped them to maintain their culture and identity because they did not want more people to move in the village as immigrants or as tourists, in order to preserve their way of life (Soykan, 2001). Its current name dates back to 1928 when the Governor of Izmir (the major city thirty miles away) visited this beautiful village asked the villagers to change its name to Şirince (Pretty Village).

According to Tül (2008), Şirince was an old Greek village and the major livelihood of the people was viniculture, olive growing and stock-breeding before 1924. In accordance with the Population Exchange Convention in the Treaty of Lausanne in 1924, during the Republic period, Turkish farmers from Provuşta and Tessaloniki regions of Greece exchanged the entire population of Şirince.

Today, in Şirince, besides agricultural production, wine and olive oil are produced. The settlement started with wine-making homemade wines. There are more than 10 wine houses and two vineyards have tasting and retail sales stores in the village. This characteristic of the Şirince settlement dates from the Greeks and has an important place in the local identity.

Şirince is an authentic settlement that has cultural and ethnic diversity in urban pattern with cultural assets that consist of churches, fountains, mosque, traditional houses built in Ottoman period. St. Ioannes Church, St. Demetrios Church, Historical primary school, Çınaraltı Square and Çeşme Square are an important physical identity components of the village.



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St. Demetrios Church, St. Ioannes Church and Çınaraltı square attract attention among the traditional houses. *St. Demetrios Church* was located on small hill and it is in front of the historical primary school. In the east-west direction, the wooden planks and dyeing samples which date to the church in the rectangular plan, reveal that it is an original structure in the beginning. Today, however, it is in a bad situation (Figure 2). *St. Ioannes Church* is the most important landmark of the settlement. It was built on the an old church in 1805. Its plan schema is rectangular, in east-west direction. So many frescos were disappeared but frescos, belongs two saint are still visible. It was restorated in 2000 (Soykan, 2004), (Figure 3).



Figure 2 St Demetrios Church



Figure 3 St Ioannes Church

Mabed Church, Mağara Deresi Church and Elemen Mevkii Church are the other churches are located the vicinity of the village. There is tower remains, monastry remains, aqueducts, karıncalı slope and cibe. It isn't known that when they were built in Şirince except the churches. There is a mosque close to Çınaraltı Square built in 1968. Primary school building (Figure 4) is an monumental building with a fountain in front was constructed in 19. century with neoclassical order (Soykan, 2004). Today, it is used as a restaurant.



Figure 4 Historical primary school building with a fountain

In order to protect the unique settlement of Şirince and its houses, two churches were preserved in 1978 and two houses were preserved in 1979. Afterwards, the village was declared as historical preservation area and approximately 88 civilian, antique architecture



samples were registered and taken into preservation programs in 1984 and it was added to the nature preservation agenda of the Turkish government in 1997. 32 houses were preserved in 2004 and today the number of preserved building is 125 (Kaplan, Küçükerbaş, & Özkan, 1997).

The traditional urban pattern of the village shaped with physical and socio-cultural factors has unique architectural and natural characteristics. The village was located on the southern and western slopes of the valley and the streets were arranged parallel or diagonal to the slope, so erasion was largely prevented. This spatial features prevent to close the view of the buildings which are well integrated with the slope and this position forms the townscape (Figure 5) (Soykan, 2004; Biçen, 1990).





Figure 5 The urban pattern in Şirince

The settlement pattern has an ecological character, based on the topographic structure of the land and natural resources such as sun, wind, and snow, taking into account the optimum utilization of the settlement. Organic urban pattern constitute a surprising affects with its narrow streets and well-defined outdoor spaces. The streets paved with cobblestone and natural stone are on the human scale and the orientation of the form is positively affecting accessibility. In addition to allowing the streets to move within the settlement, visual perspectives are also important.

There is two neighboorhod in Şirince, seperated with a river from each other: *İstiklal* neighboorhod is on the west of, *İstihlas neighboorhod*, is on the east of the river. In İstihlas neighborhood, streets are narrower and have a closed spatial feature. The streets in this neighborhood are more active and preferred in terms of being the churches and the areas where tourists are used extensively. The social structure and life style of the village are the biggest influences on this. The street passing under the house in both neighborhoods displays an interesting image (Soykan, 2004).

Çeşme Square in the center of village links two neighborhoods. Çarşı Street that links two squares is the most intensely used street of the village due to the trade and business focus. There are restaurants, cafes and wine tasting places serving more tourists around Çınaraltı Square and it is keeping the local sprit. Where as, in 1980's, the texture of the street is determined by the traditional crafts such as the saddlery, the blacksmith, the barber, the butcher, the coffee shop and the bakery, in the present, the wine houses, gift shops and workbenches of hand-knitted work are located in the street (Soykan, 2004). The main street between entrance of the village and Çarşı Street is closed to vehicular traffic. On this pedestrian road, the countrywoman are getting additional income by selling natural and cultural herbal products and various handcrafted products on the stands (Figure 6).

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Çeşme Square

Çınaraltı Square

Çarşı Street

Figure 6 Main public space of the settlement

Houses were built in 19th century and early 20th century with Ottoman architecture features in the village. They are original with layout/floor plan, building material, architectural and artistic characteristics. Houses are either located directly on the street or surrounded by a garden. The stone has been used as a building material. Houses commonly have two floors. First floor is used for service and storage, and second floor is for residence. Doors and windows almost have the same building material and craftsmanship. There are doorknockers on the street gates shaped like hand and circle rarely like a bird. There is wooden shutter on the windows for prevent negative climatic conditions. Also houses have paint, wooden craftsmanship and plaster work on the facade. These are features of traditional public art. Plenty of houses maintaining their unique characteristics but some of them that have not been repaired or repaired have become ruins and some have lost their originality due to improper repairs. Nowadays, some houses are used as a pansion (Soykan, 2004).



Figure 7 Traditional houses of Şirince

The form of settlement has been a positive influence on Şirince's livability by providing neighborhood relations, indoor-outdoor integrity and working, housing and living areas together.

Traditional Greek and Turkish dishes prepared using natural plants are another factors that create the potential for cultural tourism. Some traditional food varieties unique to Şirince have become local tourism products. Presenting traditional Greek and Turkish foods that use radicco (chicory), maraza (fennel), ivy, asparadcas (wild asparagus) blessed thistle and elegant dinning tables in restaurants and pensions is other elements that constitute cultural tourism potential. Also, wine is the fundamental tourism resource in Şirince. The wine factory,



established in 1999 with the Turkish-German partnership, played a major role in the recognition as a wine-making village. In this frame, vintage events and Wine Festival are organized every October. In addition to the fabric, traditional methods of wine production are being performed in the houses.

Conclusion

Cultural tourism is promising for the preservation and development of cultural heritage within sustainability principles. The main goal of cultural tourism planning should be developing strategies that would reduce the negative impacts on cultural values and enable maximum economic input by means of value marketing.

Şirince located in developing tourism region in Turkey is a unique settlement with its cultural landscape features forming with geographical position, residential architecture and typology of the urban pattern and local identity in the Aegean Region. As a result of the analysis, it could be considered that Şirince has strong cultural tourism potentials and it can be evaluated as strengths of the traditional settlement. Development strategies can be determined so as to provide the historical and cultural continuity of Şirince and to protect its unique urban identity for transferring it to the next generations as a cultural tourism destination.

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The Antecedents of Destination Loyalty in Sport Tourism Development

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Abstract

The decision of tourists to choose a destination is one of the important issues that has been considered by researchers. Based on the results, safety, service quality, destination image and social environment may be antecedents of destination loyalty in sport tourism. Soccer premier leagues` authorities in Iran are supposed to consider spectators and fans` concerns in to consideration in order to substantiate their destination loyalty. The present study develops a theoretical background in this respect. All the underlying theoretical background has been taken into consideration. Based on the results, safety, service quality, destination image and social environment may be antecedents of destination loyalty in sport tourism.

Keywords: Destination, Loyalty, Sport tourism **Conference topic:** Academic Conference on Transport, Tourism and Sport Science in Prag 2017, Czech Republic (AC-TTSS2017).

Introduction:

Sports tourism is defined as a leisure-based travel. People temporarily move from their home for games, watching sports, or seeing the charms associated with these activities (Kasimati & Dawsona, 2008).

Sports tourism is a relatively new industry. It is one of the segments of tourism that has the fastest development and has been identified as a factor in economic and social regeneration of urban and rural communities. It seems that sports tourism is a means for improving the quality of life for residents through attracting tourists and contributing to improving the economics of local economy (Kasimati, 2005).

There are various types and definitions of sport tourism and different experts have different idea about it. One of the experts whose definition is so popular is Gibson. Gibson (2006) defines sport tourism as "leisure-based travel that takes individuals temporarily outside of their home communities to participate in physical activities, to watch physical activities, or to venerate attractions associated with physical activities".

Based on Gibson's definition, sport tourism can be categorized into three groups of active sport tourism, event sport tourism and nostalgia sport tourism (Adabi, 2006). However, sport tourism in all its different types, is a service industry and is influenced by services provided. Service quality is a key concept in tourism organizations, because researches have



suggested service quality directly is related to repeat vision of tourists and make more benefits for organization (Kouthoris and Konstantinos, 2005).

So, it can be said quality management is an important issue in tourism policy that can help tourism and sport tourism development. Tourism development, especially in less developed countries, is an important factor in tackling poverty. It increases the revenue of various segments, reduce unemployment, increase economic prosperity and social welfare, and result in improved quality of life (Tassiopoulosa & Haydamb, 2007).

Conceptual Frame work

For succeeding in attracting tourists, the destination countries should provide the necessary infrastructure according to their geographical and cultural characteristics and convert themselves to a tourist destination. This requires a systematic approach towards tourism in order to develop tourism through the creation and provision of the necessary facilities.

Providing needed facilities is the first step in attracting and retaining tourists. Familiarity with the region provides the needed information for the development of tourism. Therefore, the needs and expectations of tourists will be met and their satisfaction and loyalty towards the region will be attracted. Expectations of tourists from the region are formed based on the experience of previous trips, propagandas, and others` recommendation.

The perceived service quality, perceived facilities quality, and perceived value has a direct impact on the quality of the travel, tourism experience, and level of demand in the future (Uysal, 2003). In other words, the possibility of tourists return depends on their satisfaction from the destination. Their satisfaction will increase their loyalty to the destination. As a result of this action and reaction, a growing and developmental cycle will be created and the destination will benefit from economic, social, and cultural advantages.

Like the other services, consumption experience in tourism is complex due to being subtle, dynamic, and subjective. Tourists' experience includes a complex combination of tangible, objective, and practical components -travel, food, drinks, and recreation- and also symbolic, emotional, and enjoyment -joy, laughing, having a good time, and socialization (Williams, 2005).

High quality service and guaranteed customer satisfaction are the most important factors for the success of tourism industry. High quality services, tourists' satisfaction, and loyalty to a destination are closely related to each other. Customer satisfaction has a key role in the success of businesses strategies. Studies show that companies that have paid attention to customer satisfaction have been successful in increasing the efficiency of production processes, the company's rapid growth, increasing knowledge about the customer, and increasing the value of their products. The customer satisfaction is a determining factor in customer loyalty which leads to customer retention (Ebrahimpoor, 2011).

The destination selection process consists of five stages of decision-making hierarchy: 1) the decision to involve (Travel), (2) The decision to invest in tourism, (3) the frequency and



duration of stay, (4) the decision about tourist destination, (5) the final destination and type of transport (Law, 2004 & Smith, 200). The tourism destination selection has two unique characteristics making it different from other products: (1) Tourism is experience-based rather than product-based (2) the real purchase and consumption occurs in the destination and not in the resident location of tourists (Hsieh, 2004 & Ibrahim etal., 2005).

Method

The decision of tourists to choose a destination is one of the important issues that have been considered by researchers. Such decisions are closely associated with the loyalty of tourist to destination (Smith, 2006 & Huang etal., 2006). Numerous studies have examined the relationship between loyalty to destination and tourists' behavior (Lin etal., 2006 & Petrick etal., 2005). If tourism managers and marketers may guess the possibility of selecting a particular destination by tourists, they may estimate the demand of tourists properly and implement strategies to satisfy their demand (Opperman, 1999).

Measuring the loyalty to a brand, product, or a tourist destination is difficult. There are two major issues concerning the loyalty measurement that includes the type of used and the level of measuring loyalty to a tourist destination (Oppermann, 1999). There are three types of data for loyalty measurement including behavioral data, attitudinal data, and combined data. However, studies have pointed out that behavioral measurement is not free of error due to the lack of distinction between true loyalty and spurious loyalty.

But, on the other hand, this type of measurement has attracted attentions for focusing on longitudinal data. The attitudinal measurement has been criticized for its focus on cross-sectional data (Oppermann, 1999). Finally, combined data have been considered by researchers because of including the data of both types (Riley et al., 2001 and Lee, 2001).

The index for measuring loyalty to a destination has been a challenging issue among researchers. For example, Chen and Gursoy (2001) interpret loyalty to destination as tourists` eager to recommend it as a tourist spot. Riely et al. defined loyalty to destination as the best indicator of visiting destination frequently. Also, Patrick (2005) and Crosby et al. (1990) argue that past experiences of tourism can affect the loyalty of tourists.

This is an important question for sports marketers and sports managers who are responsible for organizing sport events: What factors affect frequent re-visit or return of tourists in athletic events?. However, the increased number of tourists is associated both directly and indirectly with the level of revenue in sport events. Providing high-quality services, easy transportation, and attracting the tourists satisfaction influence tourist loyalty to return to the sport events (Travassos, 2008 ; Huang, 2006 & Ibrahim, 2005). By determining the factors influencing tourist loyalty to attend sport events or return them, sports marketers and sports managers may develop strategies for attracting tourists (Jacoby, 1978).



Results

The studies of Mosin (2005), Kim and Patrick (2005), Kesin (2005) indicated that the host city may take concrete steps in attracting tourism and sports tourism by hosting important events. Also, the studies of Kozak (2005 showed that the host city may help to tourists' attraction by providing accommodation facilities and facilitating the access of tourists to tourism attractions. Soolberg and Prussia (2007) believe that hosting major sports events will lead to long-term positive changes in tourism demand.

Large sporting events require costly investments in sport equipments in non- sports buildings of city. These investments must be consistent with the long-term plan for the economic success of event. Most of the cities which demand hosting of major sporting events to earn significant short or long term regional income. Law (2006) investigated the driving factors in attracting tourism and selecting destination.

The findings showed that factors such as social and psychological factors, relaxation and social interaction in sport venues, tourism attractions, tourism expectations, destination image are the attracting and driving factors. The empirical literature related to tourism indicate that tourist satisfaction is a good predictor of revisiting the destination and recommending it to others (Rimmington, 2000).

The studies of Ling and Ding (2005) showed that trust and satisfaction are the components of loyalty. Also, Chen and Gursoy (2001) showed that the safety, perceived cultural differences, and transportation are the three characteristics that affect the loyalty to tourist destination. Ibrahim and Jacqueline (2005) suggested that there is relationship between the satisfaction, security, comfort, service, the atmosphere of the tourism area, and cultural differences. Also, Riley et al. (2001) concluded that loyalty is the result of satisfaction, commitment, and attitude of tourists.

Conclusion

Nowadays, one of concerns and problems of international sporting events organizers and marketers in the Iran is raising the interest of visitors and spectators to sports events, identifying the factors affecting their presence, and identifying the type, process, and model of marketing fitted with each of the target communities and markets. However, it is necessary to have a comprehensive and appropriate model for sports tourism which act as a framework for implementing the strategies of sports tourism.

Different models have been proposed for the satisfaction and returning of tourists, and their loyalty to tourism destinations (Travassos, 2008; Lee, 2001; Huang & Chiu, 2006; Ebrahim Pur, 2011; Foster, 2001; Yusal, 2003; Chen, 2010; Guerreire, 2006 & Jin HUE, 2001) as follows:

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Satisfaction>. Loyalty to the destination (Huang & Chiu, 2006). Image of destination> Perceived quality.....> satisfaction.....> loyalty to the destination (Chen, 2010).

In summary, the findings show that the quality of sports services (Shonk, 2006), safety (Shonk, 2006; Travassos, 2008 ;), cultural differences (Travassos, 2008), transport (Travassos, 2008; Shonk, 2006 ; Huang & Chiu, 2006), image from destination (Chen, 2010), and environmental factors (Ebrahim Pur, 2011) are variables that have an impact on the satisfaction and loyalty of sports tourists. In the following researcher made conceptual model, a combination of theories of models have been included. *A. Heidary et al.* 120.

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Analysis of Tourism Experiences Through Photographs According to Tourist Gaze Typologies

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Abstract

The idea of making sociological research through visuals in tourism is quite old. John Urry, one of the tourism sociologists, has worked for many years on the visual nature of the tourism experience. Urry (1990) emphasizes that the tourist gaze reflects what tourists want to see, what they are aware of, and expectations. Despite the large number of studies related to experience in tourism literature, the fact that the number of studies referring to the visual nature of tourism experience is low, and the way in which visual sociology presents important data collection and analysis methods for tourist gaze and analysis of tourism experience are important sources of motivation for this study. The aim of this study is to analyze the tourism experiences according to the tourist gaze typologies through the comments and evaluations of the photographs of the tourists using their photographs technique, focusing on the visual nature of the tourism experience. The theoretical basis of the research is based on the visual sociology and the tourist gaze approach. Within the scope of the research, tourists who visited Antalya province of Turkey in the summer of 2017 and participated in city tours were examined. Mixed method was used in the research. Within the scope of the quantitative methods, Tourist gaze typologies were determined by survey technique and the collected data were analyzed by content analysis within the qualitative method. The results show that there are significant differences between tourists who have different tourist gazes and what they want to see in their tourism experience.

Keywords: Tourism Experiences, Tourist Gaze, Photographs, Photo-Elicitation

Main Conference Topic: Tourism

Introduction

The relation between tourism and photography are emphasized in tourism literature (Hsu & Song, 2014; Pullman & Robson, 2007; Scarles, 2009; Jaafar & Ismail, 2015; Sun, Ryan & Pan, 2014; Caton & Santos, 2008; Stepchenkova & Zhan, 2013; Santos, 2016; Ye & Tussyadiah, 2011; Prideaux & Coghlan, 2010; Brickell, 2011; Kádár, 2014; Gáli & Donaire, 2015; Zainuddin, 2009; Dewar, Li & Davis, 2007; Larsen, 2005). Being a tourist includes to take photographs and taking photos is consired one of the signs of being a tourist (Markwell, 1997). Sontag (1977) emphasizes the accepted normative relationship between tourism, tourists and photography as "it is not natural to travel for pleasure without a camera". Bruner (1986) emphasizes that the production of photographs and circular photographic frames have



shaped the meaning of tourism. In the same way Human (1999) and Urry (2002) also point out that photography shapes the tourism and today's tourism without photography is not possible. Photographs are one of the most effective reminders of people's vacation and are considered the latest product of travel experiences. Photographs, besides having stimulating effect of memories, are seen as a physical representation of reflecting the dimensions and touristic characteristics of individual experiences when traveling. Photographs beside than being effective stimulants of memories, have also specific extend of a person's travel experience and are seen as representatives of physical reflection of tour characteristics. Photographs are regarded as reflection of expectations, personality and values in describing tourists experiences (Groves & Timothy, 2001). Tourists are individuals who experience noneveryday experiences and perceive it for the first time and they remember their experiences in the future through photos, videos and souvenirs. For Urry (1990), Osborne (2000) and MacCannell (1976) photography helps tourists to remind the meaning of the places they visited and their travel experiences when they go back to their countries. Urry claims that a particular piece of organized visual experience has created a distinct product of tourism and calls it "Tourist Gaze": it expresses that the minimal character of touristic activities is formed from the gazes of visual qualities typical of old buildings, columns, artistic objects, food and destination, and that tourist gaze is created, experienced and sustained by visual experience. According to Lee (2001) tourist gaze is a social construct that involves tourists making sense of where they are traveling and viewing their experiences. The metaphor of Tourist gaze that conceptualizes the relationships between imagery and imagination, which is synonymous with the consumption of tourists'cultures and places, includes the opposite of what is normally happening (Urry 2002). According to Goggin (2006) tourists can look at extraordinary things during their trips and photograph them as well as unexpected events they have not experienced in their everday lives. The gaze is seen as a much more attractive tool for analysis because of existing visuals and cultural patterns (Pagenstecher, 2007). Urry (1990) suggests that tourist gaze is about tourists' perceptions of their socially created experiences. These are what tourists want to see, what are they aware of and what they expect. So it is not wrong to say that tourist gaze is the mind of tourists. Urry (2002) mentions that there is no single tourist gaze but five different types of tourist gaze:

- i) Romantic Gaze: (Lonely, to gaze in awe, the pursuit of authenticity) Its originality includes researching and curiosity. The group of visitors who have this gaze are intently interested in seeing new things and in a sense of being in awe (The photographs of untouched nature and landscape, abandoned beaches) Urry, 2002). Change, curiosity and sense of novelty are considered as elements of travel motivation (Gaya, 2013).
- ii) Collective Gaze: (Collective activity, gazing the well-known, carnival feelings, coexistence with a large number of tourists): it involves the feelings of gazing the well-known things and visiting places with a friend, family or a group (Mass tourism example) (Urry,2002). The feeling of cultural heritage, identity, resting and remembering are considered as elements of travel motivation (Gaya, 2013).
- iii) Spectator Gaze: Photographing around from the window of a bus (Collective activities, series of short encounters, browsing and accumulating different images).
- iv) Environmental Gaze: (Collective organization, didactic view focused on teaching and learning as much as pleasure and entertainment, conservation oriented). Tourists having this gaze are focused on education and learning. They travel to the respective localities organized in groups with protection instinct. It contains tourist groups that are curious and keen to learn.

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vi) Anthropological Gaze: (Alone, observation and making active comments)

In recent years, there has been a tendency to use visual, visually and visual methods in many disciplines and research areas. Visual sociology has also proven to be a successful discipline to examine the relationship between visuals and tourism (Burns, Palmer, & Lester, 2010). The tendency to reveal innovative approaches in research is increasing the use of visual methods in tourism research (Banks, 2001, 2007; Banks & Morphy 1997; Deveraux & Hillman 1995; Emmison & Smith 2000; Harper 2002; Wiles et al.; 2008; Crouch & Lübbren 2003; Crang 1997; Urry 2002; Jaworski & Pritchard 2005; Rakić & Chambers, 2012). The idea of conduct sociological research through visuals in tourism is rather old. Osborne (2000) argues that "if there were no photos, it would not be a contemporary global tourism industry." By the emphasizing that most of the tourism activities are based on visually, Rakić and Chamber (2010) state that visual methods can help researchers to provide information about events those traditional non-visual methods cannot easily reach. Visual representations are increasingly important for tourists themselves as well as the tourism industry (Mercille, 2005). According to Burns, Palmer and Lester (2010) people live in the material world (Photographs, Brochures, TV Documents and Postcards etc.) and tourism is a rich cultural and commercial part of the this visual material world. Visual researches cover also context related to tourists' travel experiences (Hitchcock & Teague, 2000; Love & Sheldon, 1998). In recent years emerging visual techniques (photo production, voluntary photography, etc.) seem to be effective in understanding what are experiences mean according to people (Schwartz, 1989). At the same time, it is stated that the destination-specific visual characteristics have a role to shape travel memories, experiences and expressed meanings (Rojek & Urry, 1997). It is also emphasized that the use of visual research techniques contributes to increasing the quality of data collection and analysis (Clark-Ibanez, 2004; Harper, 2002; Jenkins, Woodward, & Winter, 2008; Morgan & Hemmington, 2009; Rose, 2007; Willson & McIntosh, 2010).

Tourist photographs are thought to be an effective means of understanding travelers' experiences, but the number of studies conducted in different cultures is in limit. In this study, the tourism experiences of Turkish tourists who visit Antalya tourism destination were examined with photographs taken by them. The photographs were examined with mixed method (Convergent Pattern). The examined photographs were taken by tourists voluntarily. It was asked to take photographs in Kaleici, which is the center of Antalya, from four tourists who came to Antalya in 2017 and participated in the city tour. This study is a case study as a one type of qualitative researches. Within the scope of the research, data were gathered by document analysis (photographs taken by tourists) and interviews. Tourist gaze typologies were determined through Survey Technique as a one of the quantitative method, and content analysis was applied to analyze the data.

Implementation

Although qualitative research methods including deep interviews, focus group, and participant observation are important when analyzing tourist experiences, many researchers (Clark-Ibanez, 2004; Harper, 2002; Jenkins, Woodward & Winter, 2008; Morgan & Hemmington, 2009; Rose, 2007; Willson & McIntosh, 2010) have benefited from visual research techniques that can help to overcome difficulties of more traditional methods. The "Photo-Elicitation" technique which is framed the travel experience and called the interpretation of photographs that the most important and the most meaningful for participant in the interview process. In interview participants were asked why those photos are taken and


interpreted (Harper, 2002). This technique was used in this study because this technique encourages participants to comment on behaviors related to experience and emotion (Will, Eadie, & MacAskill, 1996) and to reveal emotions and experiences during travel inspired by the existentialist sociological approach (Gubrium & Holstein, 1997).

In this context, the mixed research method was used in the pilot study. In terms of qualitative methodology semi-structured interview and document analysis (Tourist Photographs) and in terms of quantitative method survey technique as a nominal measuring instrument were used. The photographs taken voluntarily were used in the research because it is considered more appropriate to use the photographs taken in the case study (Matteucci, 2013). Photographs taken by four foreign tourists regarding the topic and content of the research were evaluated within the context of document analysis. Photographs taken by tourists about the experiences of tourists in Kaleici region, which is one of the city tour routes along with tourists participating in Antalya City tour, have reviewed with Photo-Elicitation technique. In order to examine the nature of photographs, content analysis which is widely used in other visual media (Turley & Kelly, 1997; Wheelan & Abraham, 1993; Ramaprasad & Hasegawa, 1992; Timothy & Groves, 2001) has been used. In terms of quantitative method, tourist gaze typologies (Romantic or Collective) were determined with survey technique and collected data were analyzed by qualitative content analysis. Upon data collection process, researchers applied an objective coding scheme in order to derive systematically comparable information through content analysis (Berg, 2007). Each of the researchers independently coded and categorized the data from the replies of their photographs into different categories under each tourist gaze. The categories researchers used in this content analysis were determined inductively with the researchers "immersing" themselves in their replies in order to identify the dimensions or themes that seemed meaningful to the producers of the replies under each tourist gaze. The results show that there are significant differences between what tourists would like to see and tourists' expectation in tourism experiences in terms of different tourists gaze typologies (Romantic or Collective).

Results

According to the results of the research, it is determined that the tourism experience can be analyzed with visual sociology methods. The results of the research reveal that there are differences in tourism experiences according to the tourist gaze. In the research, tourists were asked to reflect their experiences on photographs taken based on the "Romantic" and "Collective" gazes. Tourism experiences have been reflected on photographs and interpretations at different points according to tourist gaze typologies. Interviews were conducted with a total of four tourists, including 1 Indian lady, one Albanian male, one English lady and an American male. Result of the content analysis about the basic and subcategories of the Romantic and Collective Gaze related to reflecting tourists' experiences are shown in Table 1 and Table 2.

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Tablo 1. Analysis of Tourism Experiences According to Romantic Tourist Gaze Typology Romantic Tourist Gaze Typology

Photo Contents Self-Presentation Historical Monuments Natural Beauties Cultural and Religious Values Cultural Identity: National Values Sustainable Historical Structure Ancient Architecture Street Animals Handmade Original Artifacts Aesthetics Value

Meaning/Significance of Photo

Modernizm and Authentic Reflecting Holiday Experiences on Photos Reminding Past Holiday Experiences Reminding the Private Life Animal Conservation Conciousness

Originality

Original Historical Values Authentic Religious Icons Different Architectural Structures The Integration Past and Modernity

Photo Taking Motivation

Capturing Moment Memory Sharing Travel Experience Finding Aesthetics Experiencing Difference Originality and Authentic Showing to Family/Friends Awakening Curiosity in Others Understanding and Telling History Reinforcement Learning The Integration Past and Modernity Sharing on Social Media Changing Destinastion Negative İmage Advise Integration of Everday Life with Touristic Life

Development of Destination Image Integration and Nature and History Reflection of Animal Conservation Meeting Things of Interest Impressiveness

<u>The Stories To Tell</u>

The Integration Past and Modernity Original Architectural and Historical Values The Beauty of Different Natural Environment Unusual Sea Animals

Experience

Experience Difference Interesting Values Originality Impressiveness

<u>Memorable</u>

Natural Beauties Original Values Animal Conservation Consciousness Free and Happy Animals Being a Part of Everday Life The Integration of Modernizm and Authentic Old Architectural Buildings The Existence of Artistic Constructions



In this research, tourists visited Antalya destination and participated in the city tour and took photographs in Kaleiçi were requested to interpret their experiments based on photographs taken by them voluntarily. Photographs and comments about the experiment have been reviewed with content analysis and document analysis methods.

According to the results of the research, it is revealed that reflection of tourism experiences on photographs and comments have similarity and differences according to tourists gaze typologies. When photographs and comments about the "Contents of Photographs" taken by tourists are examined, it is concluded that for tourists with a romantic gaze it is important to reflect their experiences with photographs related to more unique and authentic cultural, national, natural and historical values, and this supports the tourist gaze theory of Urry (2002). According to results, tourists with collective gaze reflect more natural and cultural values on photographs, and often take photographs of spouses or family, group photographs. It supports Urry's (2002) tourist gaze theory when tourists' comments on photographs and photographs are taken into account. When the comments on the photographs of the tourists about "why they took the photograph" (Photo Taking Motivation) are examined, it is revealed that tourists with a romantic gaze motivated with different experience desire (Urry 2002) and tourists with collective gaze seem to be seeking similarities. While tourists with a romantic gaze comment on why they took those photograph with more specific motivations such as authenticity, image, comprehension and expression, arouse curiosity in people; tourists with a

collective gaze comment on why they took those photograph with the cultural similarity and sharing in the social media. Moreover, common points (sharing moment, for memory, showing to family / friends, history recall) of different gaze typologies are indicated in Tables 1 and 2. When the comments on photographs related to "Meaning/Significance" and "The Stories to Tell" when they return home" are evaluated, it is emphasized that according to tourist with a romantic gaze, the difference is the frontal plan, the modernism and authentic structures are intertwined, the authenticity is high in the judge and the local animal. When the comments on photographs related to " Meaning/Significance " and "The Stories to Tell" when they return home" are evaluated, it is emphasized that according to tourist with a collective gaze, they are said to bear the same / similar symbolic and cultural values, to remind their countries and to emphasize their cultural similarities. When tourists asked to comment on the "Originality" sides and "Experiences" of the photographs taken as voluntary, tourists with a romantic and collective gaze were found to share common points (historical values and different architectural constructions) about originality. Regarding the issue of experience, while tourists with a collective gaze emphasize the similarities they see with their own countries, as well as with their daily life experiences in tourist life, tourists with a romantic gaze perspective emphasize expressiveness and experience the different things. Finally, when comments on the "memorable" dimension of photographs are reviewed, while tourists with a romantic gaze have revealed the memorable conclusion of authenticity, modernism and autonomy, tourists with a collective gaze have revealed the conclusion that originality, common culture consciousness and similarities with their countries are more memorable.

It is revealed that the tourism experiences are similar to and differentiated from the photographs according to the different tourist gaze typologies with this study. Moreover, the results of this study are expected to contribute to John Urry's "Tourist Gaze" theory with comments on photographs taken by tourists and experiences.

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Attached File:

Collective Gaze Photos



Photo 1. Natural and Historical Beauties



Photo 2. Meeting Things of Interest: Chains

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Photo 3. Entertainment Places



Photo 4. Happy Memories with Friends

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Photo 5. Sharing the Same Culture **Romantic Gaze Photos:**



Photo 1. Free and Happy Animals







Photo 2.Natural Beauties- Experiencing Difference



Photo 3. The Integration of Modernity and Authenticity



An Analysis of User-Generated Content for Visitor Experiences of EXPO 2016

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Abstract

With the participation of 58 countries, Expo 2016 has created an important opportunity to form a positive image and difference for the field of Turkish tourism in today's tourism marketing field. The aim of the research is to examine the positive and negative experiences of domestic and foreign visitors participated in the Botanic EXPO 2016 held in the province of Antalya and accepted as one of the most important organizations of the world after the Olympics. Categorizing the types of experiences most often mentioned in online reviews related to Expo 2016 experiences on social media constitutes the other purpose. Online reviews of visitors' experiences will be considered as basic data with user-generated content analysis. In this context, the authors will benefit from the views uploaded by the users to the "Expo 2016 Antalya" Facebook social media tool. By evaluating the comments of the visitors' experiences, the information about which elements are effective in creating a positive brand image will be provided to Expo executive board. It is believed that this study may be effective in the development of services in other similar activities and on emphasizing the strategies that can be created by strengthening the brand image using online reviews.

Keywords: Tourism, Mega Event Experiences, Expo 2016 Antalya Turkey, User-Generated Content

Main Conference Topic: Transport, Tourism and Sport Science

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Loyalty to Sports Teams: The Role of Brand Personality and Emotional Attachment in the Context of Professional Hockey Teams

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Abstract

Diverse types of sports are practiced all around the world and according to researchers; the social, cultural, and economic importance of sports is undeniable. As competition becomes increasingly tough, sports teams and brands make huge efforts to understand their fan base as a way to increase revenues. However, the sports product is complex, unpredictable, and requires a massive investment. Furthermore, the sports product is one of the few for which consumers experience passion and fervour. Fans of a sports team generate emotional reactions and feel a high psychological interconnection toward the teams they support [1,4]. These reactions are stronger in the sports industry compared to other industries [7]. Given the many billions of dollars at stake and the highly competitive environment in the sports industry, the brand management of professional sports teams is of the utmost importance. Marketing managers need to develop strong team-fan relationships regardless of team performance. Consequently, a better understanding of the determinants of fan loyalty is an important issue for managers of sports teams.

Therefore, this study investigates the relationships between brand experience, brand personality, brand attachment, and brand loyalty for professional Hockey team. The model postulates that hockey club brand personality and hockey club brand experience impact the emotional attachment to team brand (both dimensions, investment and dividend). In turn, the emotional attachment to a team band influences brand loyalty and e-WOM.

Data were collected from 472 Canadian fans of the National Hockey League teams that responded to an online questionnaire. We used previously developed and validated scales to measure brand personality, brand experience, emotional attachment, and loyalty. For instance, brand personality was measured using the sports club brand personality scale (SCBPS) [5]. The scale consists of four dimensions that are specific to professional sports club. Brand experience was measured using a three-dimension scale [2]: sensory experience, affective/emotional experience, and intellectual experience. The two dimensions of emotional attachment were measure using the scale developed by Dwyer and colleagues [3]. Team loyalty was measured using a six-item scale adapted from previous studies [6]. EWOM was measured using four items developed by the authors

The results showed that fans' brand experience (sensory, affective, and intellectual experience) and brand personality (extraversion, rebellious, open-mindedness, and conscientiousness) are significant predictors of both dimensions of emotional attachment (investment and dividend). In turn, investment and dividend influence loyalty and e-WOM.

This research provides relevant contributions to the sports management literature. It helps understand the development of emotional attachment and loyalty to professional sports

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teams. The study responds to previous calls on the study of sports brand relationship by focusing on the relations between brand personality, brand experience, brand attachment, and brand loyalty in the sports context.

Keywords: professional sports teams, loyalty, brand personality, brand experience **Main Conference Topic:** Transport, Tourism and Sport Science

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Effect Of Acute Exercise On Lipid Levels Of Woman

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Abstract

In this study, the aim was to investigate the effect of acute exercise on blood lipids in females.

Research group consists of females; 33,6 aged. From the beginning of the exercise to the end of acute swimming exercise, the participants gave blood samples in order to analysis the Cholesterol, LDL, HDL cholesterol and Triglyceride levels.

According to results, there was significant difference between pre and post tests in research group on Cholesterol, LDL, HDL cholesterol and Triglyceride levels (p<0,05).

Consequently, acute swimming exercises lead to significant alteration the level of Cholesterol, LDL, HDL cholesterol and Triglyceride levels in females and it could say that acute exercises are useful application in terms of health.

Keywords: Exercise, health, blood lipids

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Effects Of Acute Exercise On Some Biochemical Parameters Of Women

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Abstract

In the study, it was aimed to investigate the changes in some biochemical parameters (urea, AST, ALT, glucose, creatinine and TSH) of women with acute exercise.

50 women aged 19-48 years participated in the study as volunteers. Urea, AST, ALT, glucose, creatinine and TSH levels were analyzed in blood samples taken before exercise and at the end of an acute exercise session.

SPSS package program and Paired Samples t test were used for the comparison of pre and post test results of the obtained data. When the results were evaluated, while there was a statistically significant difference between the pre-test and post-test values of the study group in urea, AST and ALT levels (p<0,05), it was determined that Glucose, creatinine and TSH levels were not significantly different (p>0,05).

In conclusion, it can be said that acute swimming exercises applied to women cause a significant change in liver enzymes (AST, ALT) and urea levels and these changes may be considered beneficial for the health status of the individual.

Keywords: Acute Exercise, health, liver enzymes, urea

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