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Full Length Research Paper

The effect of recycling education on high school students' conceptual understanding about ecology: A study on matter cycle

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The objective of this study is to analyze and determine whether a developed recycling education program would lead to a positive change in the conceptual understanding of ecological concepts associated with matter cycles by high school students. The research was conducted on 68 high school 10th grade students (47 female and 21 male students). The research has been contextualized as a quasi-experimental design model with pretest-posttest control group and the EECUT Test was applied to the students in the research group prior to and after providing them with the respective courses with an aim to determine the effects of the Recycling Education Program (REP) on the conceptual understanding of ecological concepts by high school students. Based on the results a significant difference in the conceptual understanding of the students included in the respective experimental and control group was identified in the answers given to the EECUT WC and EECUT CC questions.

Key words: Recycling, education, ecology, matter cycle.

INTRODUCTION

Industry and technology that developed at an unbelievable rate with the industrial revolution first changed the production and consumption understanding of the people, and negative changes in the cultural environment with the nature and natural events that occurred after this led to environmental problems and its much quicker increase (Ugulu et al., 2014). Although this process seems to increase the life quality and comfort of people on one hand, it started to show its real effect in the following years (Marshall and Toffel, 2005). The unconscious use of the resources, and throwing industrial waste as if the environment will never be polluted

occurred as the real consequences of the process of industrialization that developed in an uncontrolled manner (Dogan et al., 2010). As a result of the decrease in the resources used as if it would never extinct, industrial institutions fell short of raw materials and started to consider ways of creating new sources although they are expensive (Akın, 2007). More importantly, it is believed that this is going to be worse in the next years. In short, a great majority of human beings have already started to discuss whether the benefit or harm of the developing technology is more (Ugulu et al., 2014).

Without a doubt, the real responsible for environmental

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problems and the great damage that occurs is not the process of industrialization. The fact that the process of industrialization takes place in an uncontrollable manner and individuals turn into consumption monsters constitutes the basis of the problems. Thus, environmental problems are actually educational problems as they result from the attitudes and behaviours of human beings. Education is the most important means of changing people's negative behaviours and gaining them terminal behaviours and ensuring that people as individuals get to know and develop themselves and their environment (Yorek et al., 2010). Thus, the environmental education that ensures the development of the science of environment in all segments of the society; gaining environmentally-sensitive, permanent and positive behavioural changes; protecting the natural, historical and cultural values; ensuring the active participation in the solution of environment-related problems; making people understand their mutual relations and interactions among themselves and their cultural and biological environments, and gaining appropriate behaviours for its protection is the primary and most important factors in preventing environmental problems (Republic of Turkey Ministry of Environment 1997).

In the light of all these data and the relevant literature, it was observed that there are problems in terms of the adequacy and sustainability of the practices applied in many institutions (schools, municipalities, government offices) with regard to sustainability. Considering the contributions of recycling in the protection and sustainability of environment resources, the inadequacy of this training is an important deficit in terms of our country that shows a great development potential. Furthermore, the lack of studies and findings carried out in Turkey with regard to the recycling education on which researches have been carried out for long years stand out. In this context, this research is important both in that it is experimental and contributes to the need for information on this subject. The purpose of this study is to investigate whether a positive change can be created in the conceptual understanding of high school students on matter cycles with a recycling education programme developed.

Problem statement

The process of industrialization that developed in an uncontrolled manner since the nineteenth century and the orientation towards a consumer society have led to a very quick increase in the amount of the waste generated by the society. What to do with and how to use urban waste are still among today's most important environmental problems. Protecting natural resources through recycling projects, reducing the waste and making unusable substances that we already have or qualify as garbage undertakes an indispensable role in the solution of this problem by saving energy, money and time (Ugulu, 2012).

The question with which factors the behaviours of the individuals with regard to recycling are related after understanding the importance of recycling at international level has come to the fore both psychologically and sociologically in terms of both the environmental and recycling education. Consequently, the studies on why individuals do recycling or not, it was found that the behaviours of the individuals with regard to recycling are affected by such reasons as economical factors, the convenience of recycling, the fact that recycling makes the individual feel as a beneficial person to the society, the level of knowledge about recycling, indifference towards recycling, the lack of time and the inadequacy of physical conditions (Smeesters et al., 2001). It was determined that the other factors positively affecting recycling are the effects of recycling on protecting the energy resources and the contribution to preventing environment pollution (Brody, 1997).

The attitudes and behaviours of the individuals on the subject constitute the basis of all these factors positively or negatively affecting recycling (Smeesters et al., 2001). Thus, hypotheses on what the factors affecting the attitudes and behaviours on the subject were first put forth in investigating the actions aimed at environmental education and recycling. Attitudes, values and beliefs are characteristics that provide a person particular individual characteristics and exhibit a relatively stable establishment after they are gained (Smeesters et al., 2001). Thus, they were considered as central concepts in many studies aiming to explain and foresee individuals' behaviours on recycling. When the studies on recycling are generally assessed, it was observed that some of these studies are solely based on the data on recycling (Kok and Siero, 1985; McCarthy and Schrum, 1993), while such studies as the Theory of Reasoned Action, the Theory of Planned Behavior and Schwartz's Model of Altruistic Behaviour put forth more detailed theories on behavioural sciences in addition to investigating the data of recycling.

With the gaining weight of the views that the ecological information overload based on the traditional approach are not sufficient for environmental education, it was thought that the principles of the constructivist approach that associates learning with the past experiences and information accumulation of the individuals can be

applied to the environmental education (Ugulu, 2012). Munson (1994) examined the subject of conceptual change by reviewing the researches carried out on the constructivist learning approach, and also conducted researches on how to cope with misconceptions. According to Munson (1994), "misconceptions" are scientifically incorrect interpretations made by children when responding to a problem. Accordingly, the misconceptions of the students on ecological events and concepts will give environmental educators important clues as ecological knowledge has an important place in the structuring of ecological information environmental education. Starting from this point, it is thought that the recycling education designed in accordance with the principles of the constructivist approach will be more effective in the process that individuals exhibit the terminal behaviours on recycling. The fact that a recycling education programme prepared in accordance with how the principles of the constructivist approach affects individuals' conceptual understanding of ecology considering the effect of recycling in the natural cycle constitutes the main idea of this study.

METHOD

Research design

This study was designed in pretest-posttest control group quasi-experimental research design. There are two groups created with unbiased allocation. The group that is under the effect of the independent variable among these groups is the experiment group, and the group that is not under the effect of the independent variable is defined as the control group.

Sampling

In quasi-experimental research designs, the sample size is usually kept small due to the research's characterisitics (Balim, 2013; Ilter, 2014; Gutierez, 2015). This research was carried out on 68 tenth grade students studying in two different classes of a high school in Izmir province. One of these groups was determined as the experiment group, and the other one was determined as the control group through random selection. There are 32 students in the experiment group and 36 students in the control group. 21 of the students in the experiment group are female, and 11 of them are male. 26 of the students in the control group are females, and 10 of them are males (Table 1).

Data collection tools

EECUT prepared in order to understand the extent that high school students structure the concepts about ecology contains open-ended questions for matter cycles prepared by considering the mis-conceptions of the students on these subjects through literature

Table 1. Sampling.

Group	Female	Male	Total
Experiment	21	11	32
Control	26	10	36

review. A concept analysis on "Ecosystem Ecology" which is included in the curriculum of the 10th grade of the high school was prepared for the content validity of the conceptual understanding test. The content analysis created has been a lodestar in order for the questions in the conceptual understanding test in parallel to the subjects and concepts. The content validity of the concept analysis was ensured by interviewing two biology instructors and two teachers in the field. The trial form prepared after making the necessary regulations about the content validity was applied to a student group of 30 people studying in their first year at the university, the students were asked for the parts that they had difficulty in understanding throughout the practice and corrections were made accordingly. A pilot study was carried out by applying the questions to 80 students studying in the 10th grade of two high schools in order to test the reliability, and it was made clear whether the questions are understandable as expressions and the time given is sufficient. EECUT took its final shape as a result of the data obtained from the pilot study (Table 2).

The semi-structured interview was conducted with 9 students each for the experiment and control groups (3 students each from the low, middle and top groups in terms of their levels of conceptual learning) after the experimental application. It was carried out for the purpose of revealing the misconceptions observed in the answers of the students to EECUT with their reasons. A voice recorder was used during the interviews after taking the consent of the students interviewed, and non-verbal behaviours were written on paper. Then this interview recorded was put on paper and coded, and it was classified and interpreted by determining categories. In semi-structured interview technique, an interview protocol containing the questions that are aimed to be asked is prepared. In line with the course of the interview, the course of the interview can be affected by side or sub-questions and people may be asked to clarify and detail their answers. If an individual answered certain questions in other questions during the interview, the researcher might not ask these questions (Türnüklü, 2000). The concept validity and reliability are used in association with the researcher in an interview, one of the qualitative methods of research (Türnüklü, 2000). Care was taken in asking the same question with the same words and in the same manner to everyone participating in the study. A pilot practice was carried out by interviewing individuals with similar properties with the real interviewees before applying the semi-structured interview form to experiment and control groups, and whether the interview questions are clear and intelligible and the period that must be allocated for the interview were determined.

Implementation

EECUT, used as the data collection tool of the research, was applied to the students in the experiment and control groups as pretest and posttest before and after the practice.

Table 2. Ecosystem ecology conceptual understanding test contents.

Question	Target
EECUT WC (Water Cycle)	Determining students' conceptual understanding levels with regard to water cycle
EECUT CC (Carbon Cycle)	Determining students' conceptual understanding levels with regard to carbon cycle
EECUT NC (Nitrogen Cycle)	Determining students' conceptual understanding levels with regard to nitrogen cycle

During the experimental practice, the group that is provided training in the framework of high school biology teaching program adopted with the decision No. 137 of 03.06.2008 of Turkish Education Board affiliated to Ministry of Education was considered as the control group, and the group that were applied Recycling Education Program (REP) to biology education program was considered as the experiment group. REP was prepared in a way that it constitutes a whole with the subject "Ecosystem Ecology" included in the curriculum of the 10th grade in the context of REP high school biology teaching program. Its period of the application was limited to 10-course hours determined in the curriculum for the subject "Ecosystem Ecology".

Recycling education program

The concepts that are aimed to primarily gain the students of the experiment group in the context of the program during the process of forming the REP were analyzed based on the 3R (Reduce, Reuse, Recycle) model. After the concept analysis was prepared, target concepts were placed in the subject in a way that they do not disrupt the integrity of the expression of the subject "Ecosystem Ecology". The theoretical part of the program was created this way. In the second stage, recycling activities were prepared in order to ensure that the concept related to recycling are conceptually structured in the students and that they are understood in a way that they will change their behaviours. These activities were also placed in the subject in a way that they do not disrupt the course and unity of the expression. Consequently, a "Recycling Education Program" that is integrated with the subject "Ecosystem Ecology" was created. An example of the activities applied in the context of the program is shown below.

Example of activity

WHAT IS HAPPENING HERE – 1 Targets?

It is aimed to make the students understand the concept of organic fertilizer. The concepts of organic and inorganic matters are discussed for this purpose. Furthermore, the states of the matters in nature and matter cycles are examined.

Activity materials

(1) A large plastic bag and a node, (2) A buckle of wet sand, (3) 3 grapes, (4) 5 plastic containers, (5) A handful of chopped herbs, (6) 3 lettuce leaves, (7) 2 nails, (8) A roll of white toilet paper, (9) A slice of wheat bread, (10) A sieve

Practice

(1) The teacher defines the concepts organic and inorganic matters. (2) The materials required for the activity are placed in the bag and kept in an appropriate environment for a period of one month. (3) What kind of changes can occur in the bag during this process is discussed with the students. (4) Assessments based on ecosystem elements are made in the discussion. (5) The bag is opened at the end of the process, and the latest state of the materials placed in the bag is evaluated.

Data analysis

The content analysis method was used in order to analyze the data obtained through EECUT in the framework of the research. The process carried out in the content analysis method that ensures the detailed examination of the data is to bring together similar data in the framework of certain concepts and themes and interpret them by organizing in a way that the reader can understand (Yıldırım and Şimşek, 2005). Data obtained from the data collection tool are separately coded by a researcher and another experienced faculty member. The coding made by both researchers was compared for reliability, and the necessary corrections were made by deeming a correspondence percentage of 70% and above as adequate (Yüksel 2011).

FINDINGS

In this section, the analysis of the answers given by the students to Ecosystem Ecology Conceptual Understanding Test (EECUT) prepared in order to investigate the effect of the Recycling Education Program (REP) on the level of understanding of ecological concepts related to matter cycles of the students is presented. For this reason, the analyses on EECUT WC that aims to determine the conceptual understanding of the students on water cycle, EECUT CC that aims to determine the conceptual understanding of the students on carbon cycle and EECUT NC that aims to determine the

Table 3. EECUT Water Cycle (WC) question pre- and post-test categories.

	Answers by the students	Pretest				Posttest			
		EG		CG		EG		CG	
		f	%	f	%	f	%	f	%
CD	There is a water shortage as a result of the insufficiency of groundwater resources.	2	6	3	8	-	-	-	-
	A number of usable water resources is significant.	10	31	8	22	20	63	15	42
	The reason for the water shortage is unconscious water consumption.	7	22	11	31	3	9	3	8
	The reason for the water shortage is the pollution of water resources.	1	3	8	22	-	-	3	8
	Total	20	62	30	83	23	72	21	58
ID	Global warming reduces water resources.	8	25	2	6	6	19	11	31
	The perforation of the ozone layer leads to drought.	4	13	4	11	3	9	4	11
	Total	12	38	6	17	9	28	15	42

conceptual understanding of the students on nitrogen cycle are given respectively.

With EECUT WC question, it was aimed to understand the level that the importance of the water resources is structured by the students in the framework of the water cycle. Answers given to this questions by the students in the pretests and posttests are presented in tables (Table 3). In the table, the answers of the students who made correct definitions (CD) and incorrect definitions (ID) are assessed in the table according to the question.

EECUT WC:

Approximately 70% of the world is covered with water. This water in the earth exists in the living beings with such water sources as oceans, seas, lakes and streams and is in the form of a cycle among these elements.

Accordingly, what do you think is the reason that a lot of countries in the world (including Turkey surrounded by the sea on three sides) suffer from water shortage although there is a significant amount of water in the world?

When the answers given by the students to the question EECUT WC are assessed primarily by the correct definition scale, it is observed that the correct definition percentage which was 62% before the practice in the experiment group reached 72% after the practice, and the correct definition percentage which was 83% in the control group decreased up to 58% after the practice (Table 3).

When the reasons for the decrease in the percentage of making correct definitions of the control group students with semi-structured interviews are investigated, it was observed that the students especially associate the concept global warming with water cycle incorrectly. After the practice, 19% of the students in the experiment group and 31% of the students in the control group made the explanation *"Global warming reduces water resources."* The students who made this explanation developed such a mistake that water resources will evaporate as a result of global warming and thus, water resources will decrease. This mistake shows that the students who made the explanation could not structure the water cycle as a whole. Below is the explanation of one of the students who commented this way.

Researcher: You indicated that water resources decreased as a result of global warming? What is the reason for this opinion?
Student: Water resources evaporate as the temperature in the world rises. Consequently, water resources also decrease.

With EECUT WC question, it was aimed to understand to which degree that carbon in the composition of organic molecules which are the basic molecules added into the structure of the living beings is structured in the framework of the carbon cycle by the students. The answers given by the students to this question in pretests and posttests are shown in tables (Table 4). In the table, the answers of the students who made correct definitions (CD) and incorrect definitions (ID) for the question were evaluated.

EECUT CC:

The carbon atom in a CO_2 molecule in the air is marked using the radioactive isotopes method. After some time,

Table 4. EECUT Carbon Cycle (CC) question pre- and post-test categories.

	Answers of the students	Pretest				Posttest			
		EG		CG		EG		CG	
		f	%	f	%	f	%	f	%
CD	It reaches the human beings with the transmission of the carbon into the food by the producers and then by means of nutrition.	1	3	3	8	19	59	13	36
	Total	1	3	3	8	19	59	13	36
	It reaches the liver cell through respiration.	19	60	16	44	8	25	17	47
	It reaches the human cell with the help of the enzymes.	-	-	-	-	1	3	-	-
	It reaches the human cell by steam.	-	-	-	-	1	3	-	-
ID	It reaches the human cell by means of the genes.	1	3	-	-	-	-	-	-
	It reaches the human cell with radioactive rays.	1	3	-	-	-	-	1	3
	It reaches the human cell through technological devices.	-	-	1	3	-	-	-	-
	It reaches the liver cell through the nitrogen cycle.	-	-	1	3	3	9	4	11
	Total	21	66	18	50	13	41	22	61
B	I don't have any knowledge and thought.	10	31	15	42	-	-	1	3
	Total	10	31	15	42	-	-	1	3

the marked carbon atom is seen in a human liver cell.

Accordingly, how did the carbon atom reach the human cell?

When the answers of the students to EECUT CC question are assessed primarily by the correct definition criterion, it is observed that the correct definition percentage which was 3% before the practice in the experiment group reached 59% after the practice, and the correct definition percentage which was 8% before in the control group reached 36% after the practice (Table 4). This shows that both of the programs applied to the experiment and control group students are effective in the learning of the carbon cycle event.

60% of the students in the experiment group and 44% of the students in the control group before the practice, and 25% of the students in the experiment group and 47% of the students in the control group after the practice made the explanation *"The marked carbon atom reached the liver cell through respiration"* (Table 4). This explanation shows that the students cannot structure the carbon cycle well. It is believed that this mistake can only be eliminated by increasing the emphasis during the lectures that the carbon in the air can be added to the structure of organic materials only when they are taken by the producer creatures.

After the practice, 9% of the students in the experiment group and 11% of the students in the control group made the explanation "The marked nitrogen reaches the liver cell with through nitrogen cycle. This explanation shows that the students cannot structure the carbon cycle well as well as they have problems in understanding the nitrogen cycle. It is thought that this mistake can be eliminated by increasing the emphasis that the carbon in the air can only be taken by the producer organisms and added into the structure of organic molecules, and thus creatures.

With EECUT NC question, it was aimed to understand to what extent the nitrogen cycle, one of the matter cycles, and its properties are known and structured by the students. The answers given by the students to this question in pretests and posttests are presented in tables (Figure 1). The answers of the students who made correct marking (CM) about the creatures in the cycle and the answers of the students who made incorrect marking (IM) are assessed separately on the figure.

When the answers given by the students to question EECUT NC are primarily evaluated by the correct marking criterion, it is seen that the percentage of correct marking which was 47% in the experiment group before the application reached 69% after the application, and the correct marking percentage which was 22% in the control group reached 67% after the application (Table 5). When the answers given to the question EECUT NC by the

EECUT NC:

	X			Y	Z
A)	Animal	Decomposer	Plant		
B)	Chemosynthetic Bacteria	Plant	Decomposer		
C)	Plant	Chemosynthetic Bacteria	Animal		
D)	Decomposer	Animal	Chemosynthetic Bacteria		
E)	Chemosynthetic Bacteria	Decomposer	Animal		
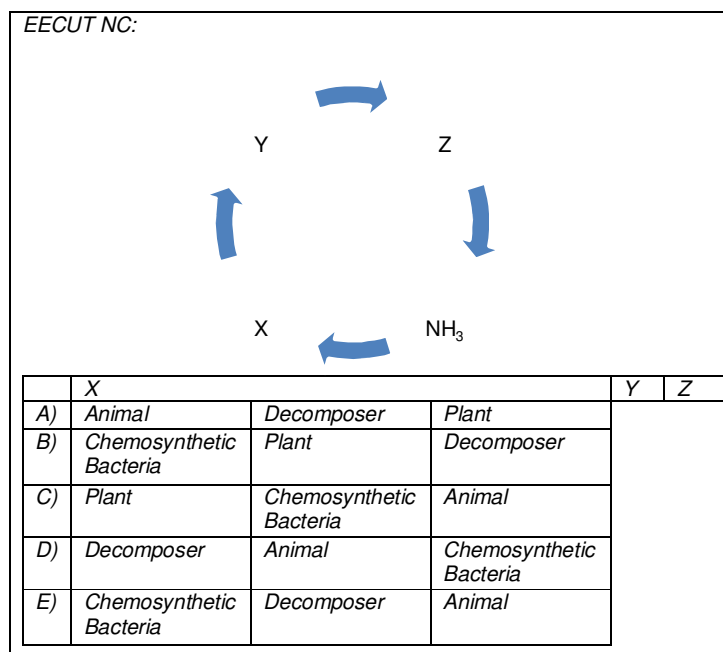
Figure 1. EECUT NC:

Table 5. EECUT nitrogen cycle (NC) question pre- and post-test categories.

	Answers given by the students	Pretest				Posttest			
		EG		CG		EG		CG	
		f	%	f	%	f	%	f	%
CM	Chemosynthetic bacteria turn ammonia produced by the decomposers into nitrite and nitrate. Plants can also use these salt.	15	47	8	22	22	69	24	67
	Total	15	47	8	22	22	69	24	67
IM	The reason for the formation of ammonia is bacteria.	11	35	20	58	10	31	8	22
	Plants use the ammonia they take from the soil.	3	9	4	11	-	-	4	11
	Total	14	44	24	67	10	31	12	33
B	I have no knowledge and thoughts.	3	9	4	11	-	-	-	-
	Total	3	9	4	11	-	-	-	-

students are first assessed by the correct marking criterion, it is observed that the correct marking percentage which was 47% before the practice reached 69% after the practice in the experiment group, and the correct marking percentage which was 22% in the control group reached 67% after the practice (Table 5). This shows that the programmes implemented in the experiment and control group students are effective in the learning of the nitrogen cycle event.

35% of the students in the experiment group and 58%

Of the students in the control group before the practice, and 31% of the students in the experiment group and 22% of the students in the control group made the explanation *"The reason for the formation of ammonia is chemosynthetic bacteria* "after the practice (Table 5). This explanation shows that these students cannot structure the nitrogen cycle well.

It is believed that this mistake can be eliminated by increasing the emphasis on the activities of the decom-posers during the practice. Below is the explanation of

one of the students who makes such a remark.

Researchers: What is the duty of the decomposers in the ecosystem?
Student: They decompose dead organisms.

Researcher: How do you explain the decomposition event?
Student: So decay... (not sure). Big molecules are torn into small molecules.

Researcher: Can you given an example of these molecules?
Student: Yes... (thinks). Ammonia produced by chemosynthetic bacteria is an example to this. I mean in the nitrogen cycle...

DISCUSSION AND CONCLUSION

Recycling has always been one of the first strategies that come to mind when individuals and institutions want to perform a positive behaviour towards the environment, however the necessary determination and stability could not be achieved apart from a few examples when it comes to certain practices. Except for the activities of certain private institutions and foundations, there are scarcely any comprehensive examples of the recycling education within the curriculum of the institutions affiliated to Ministry of Education or universities (Ugulu et al. 2014). When the place of the recycling education in the international area is examined, a multi-dimensional development stands out in this area in parallel with the environmental education. While most of the practices in our country still cannot go beyond a few definitions about the recycling education, international practices consist of complicated curriculum programs created in a way that they include high and higher education starting from pre-school education. Again in parallel with the development process of environmental education, demographic and sociological factors affecting recycling and its education have been subject that have been investigated for long years (Allen et al. 1993; Goldenhar and Connell 1993; Jones 1990; McCarthy and Schrum 1993; Pieters 1991; Thøgersen 1994). In this study developed upon seeing the deficiency about the recycling education in Turkey, how the conceptual understanding regarding the ecological subjects related to matter cycles through REP prepared by examining the main concepts and international examples regarding recycling was investigated.

When the answers given by the students in the study group to EECUT questions in pretests and posttests were examined, it is observed that the success of the experiment group for EECUT WC increased to 72% from 62%, the success of the control group decreased to 58% from 83%; the success of the experiment group increased to 59% from 3% for EECUT CC question, and the success of the control group increased to 36% from 8%; and the success of the experiment group increased to 69% from 15%, and the success of the control group increased to 67% from 8%.

According to the results obtained by assessing the EECUT findings in terms of the effectiveness of REP, a significant difference is observed in EECUT WC and EECUT CC questions between the conceptual understanding of the experiment and control groups. It can be said that the success shown by the experiment group with regard to these questions results from REP as these questions aim to determine the conceptual understanding levels regarding the matter cycles and emphasise the production derived matter cycle in the nature of REP.

As a result of the study, it was observed that high school students have many misconceptions towards basic ecological concepts. In their study, Boyes and Stanisstrect (1999) put forth that a great majority of the students developed the thought that the world heats up as one of the negative consequences of global warming, and consequently they developed such a misconception as "the desertification areas in the world will increase as global warming increases". When the answers given to EECUT WC question by the students in our study are examined, it is observed that a great majority of the students developed such a misconception that global warming will reduce the water sources. Thus, this misconception overlaps with the misconception indicated in the study of Boyes and Stanisstrect (1999).

Munson (1994) conducted researches on how the students cope with misconceptions about ecology by examining the subject change of concept after reviewing the researches carried out on the constructivist learning hypothesis. In his study, Munson (1994) determined that the studies carried out on science teaching in the framework of the constructivist approach are related to the fact that "the learning of the new concepts by the students are related to their previous knowledge (Carey 1985; Driver et al. 1985; Osborne and Freyberg 1985)." Thus, he mentioned the importance of misconceptions in the structuring of the new of information. Starting from this theoretical substructure and assessing the importance of misconceptions in environmental education, Munson (1994) summarized the main ecological concepts and the misconceptions related to these concepts. As a result of the study, it was determined that the misconceptions on this subject are quite important in terms of environmental education and instructors.

Consequently, it can be said that REP that includes concepts and activities related to recycling as well as including all concepts of the ecosystem ecology in the biology teaching program is an effective and useful tool in line with the targets of the environmental education with the success it creates in the conceptual understanding of the students.

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

Developing local curriculum framework on water resource and disaster course for enhancing students' learning achievements in the basic educational system

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The aim of the paper was to administer and prepare teachers for management to their students' learning achievements within the curriculum framework of water resource and disaster management. This course was compared to manage learning into different school sizes with the sample size in the lower secondary education schools with two groups of 28 controlled teachers, who managed teaching of 68 students in 3 classes, and other group was 28 experimental teachers who managed teaching of 79 students in 3 other classes at grade level 9 too. The procedure of methodology included curriculum framework; unstructured selection interviews and conservational guidebooks were used. Most of teachers were trained with a new curriculum of learning units and training local curriculum. Associations between teachers' satisfaction of pre- and post- test questionnaires were differenced, developing the curriculum was indicated that it has revealed problems and students' needs indicted as high responses on introduction, and purpose of recapitulating development. Teachers were passed the assessment test as high quality ability impacts and satisfactions for making learning units to students' responsibilities. Statistically significance of students' achievements were differences between the controlling and experimental groups at .01 confidence level, correlatively, and comparisons between using this local curriculum frame work in school sizes as non significant differently.

Key words: Development, local curriculum framework, water resource, natural disaster course, enhancement, students' learning achievements and outcomes, the Basic Educational System, and Thailand.

INTRODUCTION

Education in Thailand

Education in Thailand is provided mainly by the Thai government through the Ministry of Education from pre-

school to senior high school. A free basic education of twelve years is guaranteed by the constitution, and a minimum of nine years' school attendance is mandatory. Formal education consists of at least twelve years of

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basic education, and higher education. Basic education is divided into six years of elementary education and six years of secondary education, the latter being further divided into three years of lower- and upper-secondary levels. Kindergarten levels of pre-elementary education, also part of the basic education level, span 2–3 years depending on the locale, and are variably provided. Non-formal education is also supported by the state. Independent schools contribute significantly to the general education infrastructure. Administration and control of public and private universities are carried out by the Office of Higher Education Commission, a department of the Ministry of Education (Ministry of Education, 2014).

School structural education in Thailand

The school structure is divided into four key stages: the first three years in elementary school, Prathom (ประถม) 1–3, are for age groups 7–9; the second level, Prathom 4 through 6 are for age groups 10–12; the third level, Matthayom (มัธยม) 1–3, is for age groups 13–15. The upper secondary level of schooling consists of Matthayom 4–6 for age groups 16–18 and is divided into academic and vocational streams. There are academic upper secondary schools, vocational upper secondary schools and comprehensive schools offering academic and vocational tracks. Students who choose the academic stream usually intend to enter a university. Vocational schools offer programs that prepare students for employment or further studies. From early 2001, the Ministry of Education began developing new national curriculum in an endeavour to center the system of education on the child, or student-centered learning methods (Ministry of Education, 2014). The years from 2001 to 2006 showed some improvements in education, such as computers in the schools and an increase in the number of qualified native-speaker teachers for foreign languages. Experiments with restructuring the administrative regions for education or partly decentralizing the responsibility of education to the provinces were conducted. By 2008, however, little real change had been made, and many attempts to establish a clear form of university entrance qualification had also failed due to combinations of political interference, attempts to confer independence (or to remove it) on the universities, administrative errors, and inappropriate or mismatched syllabuses in the schools (Education Department of Bangkok Archdiocese, 2014).

Development of the curriculum to administer in the system education in Thailand

In formal education, a curriculum constitutes the planned interaction of students with instructional content, materials, resources, and processes for evaluating the attainment of educational objectives. This process includes the use of literacy and demagogies that are interwoven, through the use of digital media and/or texts that address the complexities of learning. Other definitions combine various elements to describe curriculum as all the learning that its planned and guided by the school administer (Kerr, 2009). Skills, performances, attitudes, and values are expected to gain from schooling by pupils. It includes the content of courses (the syllabus), the methods employed (strategies), and other aspects, such as norms and values, which relate to the way in which the school is organized. The courses are arranged in a sequence to make learning a subject easier. In schools, a curriculum spans several grades. The curriculum can refer to the entire programme provided by a classroom, school, district, state, or country. A classroom is assigned sections of the curriculum as determined by its school (Nairs and Fisher, 2001).

However, the 2000s was a time of learning and teaching reform in Thailand. Secondary education improves the quality life of students and serves as the basis for further education. It should: (a) help students discover their own abilities, aptitudes and interests; (b) provide a general education as the basis for securing honest occupations or further education; and (c) respond to the needs of the localities and the nation as a whole. Based on these aims, the curriculum is designed by the Ministry of Education for students to develop the following characteristics: knowledge and skills in general education subjects as well as the ability to keep up with academic advances; the ability to maintain and enhance personal and community health and hygiene; the ability to analyze community problems and to choose suitable alternatives for solving them, taking into account various limitations; pride in being Thai; the ability to live in peace with others and to willingly help others within the limits of one's capability; creativity and the ability to devise and improve (Ministry of Education, 2008).

In the 2010s, the Ministry of Education and the Office of the National Education Commission (ONEC), a department of the Office of the Prime Minister, began programmes of educational research. In-depth research, particularly of the ONEC, contributed to the education reform initiative of 2008-2012, and extensive research is provided by the country's universities, especially in faculties of education. The Department of Curriculum and Instructional Development of the Ministry of Education also conducts research into testing, curriculum, and content. The National Library, university libraries, and other libraries around the country are electronically networked in order to facilitate research for educational reform in Thailand (The National Education Commission (ONEC), 2014).

As far back as 2002, the Ministry of Education announced experimental application of the Basic Education Curriculum 2001 in its pilot and network schools. Mandatory implementation was subsequently effected in all schools providing basic education from

academic year 2003 to the present time. Various agencies with direct responsibilities, as well as those concerned, have continuously followed up and evaluated the application. Different strengths identified have proved to be quite gratifying. In fact, the application has been found to facilitate decentralization of educational authority, enabling local communities and educational institutions to participate and make significant contributions to preparation of curriculums that met their real needs. Clear concepts and principles for promoting learners' holistic development were quite apparent.

Nonetheless, the outcomes of the studies revealed several problems and issues of concern arising from shortcomings of the 2001 Curriculum. Problems and issues of concern included the Curriculum provisions, application process and results. Among the problems identified were confusion and uncertainty faced by practitioners in educational institutions in preparing school curriculums; the majority of schools were ambitious in prescribing learning contents and expected outcomes; measurement and evaluation did not correlate with the standards set, with negative effects on certification and transfer of learning achievements. Furthermore, issues of learners' quality resulting from acquisition of essential knowledge, skills, capacity and desirable characteristics and attributes were quite disconcerting.

Consequently, the Office of the Basic Education Commission (OBEC), under close supervision and wise guidance of the Basic Education Commission, took necessary measures to revise the Basic Education Curriculum 2001 in order to prepare the subsequent Basic Education Core Curriculum 2008. In so doing, OBEC availed of the outcomes of the studies undertaken and benefited from the data and information provided in the Tenth National Economic and Social Development Plan (2007-2011). Pertinent research results and projections led to greater clarity regarding the goals of improving learners' quality and curriculum application at school and educational service area levels. Succinct information is presented regarding the vision, goals, learners' significant capacities, desirable characteristics and attributes, learning standards and relevant indicators, allotted time to each subject area for each grade level, and evaluation criteria that correlate with learning standards and consequently facilitate curriculum implementation. All these measures were aimed at providing schools with desirable orientation and guidance for preparation of the curriculum required for each level of education. The Basic Education Core Curriculum 2008 also allows opportunities for further amplification in accord with the schools' priorities and readiness.

THE BASIC EDUCATION CORE CURRICULUM 2008 AD

The Basic Education Core Curriculum 2008 thus prepared

will undoubtedly provide all educational service area offices, local offices and basic education institutions under jurisdiction of various agencies with an appropriate framework and guidance for preparing the pertinent curriculum. The basic education to be provided to all Thai children and youths will be of higher quality in regard to acquisition of essential knowledge and skills required for learners' lives in the constantly changing society. Learners will also be able to acquire knowledge for continuous lifelong self-development. On behalf of the Basic Education Commission will henceforth be most beneficial to educational provision for the Thai people (Samudvanijja, 2012).

The last decade in particular has seen the development and reform of the education system in Thailand, with the government changing the core curriculum in 2008. The schools were to revise their curriculum to teach students more about the natural source of their surrounding environments, namely their local; water, mineral, or forestry sources (The Center of Khon Kaen News, 2011). Normally, students follow a core curriculum and are able to select additional curricular components. The local curriculum was used to manage and arrange for additional students' learning in some schools. This local curriculum should be based on relevance to community and local needs, and confirmed to indicate that all students' management. A new local curriculum framework was administered and integrated for the needs of the local community by the educational institutions in their areas. However, the schools faced too many problems trying to integrate the local curriculum framework into their learning management. Some part of curriculum teaching and learning, where teachers' knowledge was insufficient for teaching and understanding.

Developing local curriculum framework on water resource and disaster course for enhancing students' learning achievements in the basic educational system

The most critical environmental problem that Thailand is currently facing water is pollution. Despite the annual southwest monsoon, Thailand is subject to drought, particularly in its northeastern region. As of 2002, Thailand had less available water per person than any other country in Asia, and nearly one third of its water was "unsuitable for human consumption." Inconsumable water was also a result of increasing amount of untreated domestic sewage, industrial wastewater and solid hazardous wastes (ThailandOutlook.com, 2007).

In Thailand, major disasters over the past three years (2011-2013) provided stark reminders of the risks of the natural disaster that affect human well-being and future development. The trend of increasing exposure and greater losses associated with disasters demands a better understanding of their complex nature and common

causes, namely hazards, exposure, vulnerability and resulting risk. Many disasters have occurred in Thailand, leading to loss of life and economic damage. Most natural disasters that have happened in the country are storm- and flood-related, while man-made disasters have also caused great losses. This page lists by date those accidents and disasters which have caused significant losses, or have been the focus of national public attention; which are grouped into natural disasters, promoting investments for resilient nations and communities (ADPC's News, 2014).

Focused on the Northeastern region of Thailand, the great flood spread throughout the 20 provinces of Thailand; for example, in Khon Kean province, the flood plain area of Chi and Nam Phong watershed rivers. Water stream explored up overflow and cover wetland district areas, such as; Muang, Ubon Rattana, Chonnabot, Wang Yai, Wang Noi, and Manjakili Districts. This effect destroyed the rice fields and agricultural areas that were covered in the huge acres of water, the people and their families who live at the back of Ubon Ratana Dam were forced to move into the hills or to higher places temporarily, and many schools were closed. The most important problem here is how to change learning and teaching behaviours on natural flood plain or drought disaster effects. According to the curriculum orientation guidelines, teachers ought to be focusing on: (a) integrating content from daily life; (b) making greater use of activities, rather than textbooks; (c) using different learning materials in a variety of ways; (d) making students the centre of learning activities; and (e) reducing explanation and helping students. These take more time to prepare and teach according to the designated teaching/learning curriculum orientations. It is anticipated that these problems will be solved in the forthcoming process of reforming curriculum and learning activities (Ampra and Thaithae, 2008). Thailand's development agencies perceived water resource development as a key strategy toward stimulating modern economic development was built. Despite more than three decades of planning and the construction of numerous large-, medium-and small-scale water projects intended to increase water availability and improve standards of living, the river ecosystems and human communities of Northeast Thailand are instead experiencing a host of interrelated problems including water shortages, pollution and social conflict centered on water. These problems are readily evident in the Nam Phong River basin (Figure 1).

Since the construction of the Ubolratana Dam in 1966, the Nam Phong River basin has been the focus of intensive planning and management initiatives carried out by an assortment of state agencies in the hopes of stimulating regional economic development were destroyed. Results have been mixed. Most recently, controversy over environmental degradation erupted after several industries released toxic substances into the river

in the early 1990s. Galvanized by these highly publicized incidents, a coalition of state agencies, academics, business leaders and non-governmental organizations (NGOs) have spearheaded efforts to develop an effective action plan for management of the river's water quality. The action plan, in effect, calls for cooperative management, or co-management, of the river among a set of stakeholders with diverse interests toward and interactions with the biophysical processes and structures that comprise the river basin.

In terms of local curriculum framework, regional trends in the development of curriculum policy have been changing to include a particular focus on the greater participation of stakeholders in policy formulation throughout of the world, notably, in Thailand in particular. This only strengthens the political rationale for the decentralisation of education of governance and management. A second important rationale is a concern for improving the quality of education. A crucial dimension of quality education is that of relevance of curricula content in the form of; the diversity of local (sub national), cultural and socio-economic realities. The promotion of local curricula is a strategy to ensure such relevance and is an important component of the decentralisation of education, governance and management. When looking at the situation caused by flooding and national disasters as they continue to escalate worldwide, governments, schools, teachers, students, and local response, respectively. For this reason, students in Thailand or South African should be taught a local curriculum framework in their school.

Focusing on the development of the methodological curriculum orientation guidelines on water resource and water disaster courses; the purpose of this study is to emphasize the way in which administrations handle their water resources, and their readiness and ability to confront natural disasters when students are effectively trained through the curricula to respond to them. The curriculum is designed to permit students to develop to knowledge and skills in general education subjects and the ability to keep up with academic advances in lower secondary school classes. For these important reasons as above, researchers were developed the learning unit so as to onto investigate the problems and needs for developing the local curriculum framework of the basic education commission with regard to the objective of a water resources and disasters course that served to integrate content from daily life, making greater use of activities, use different learning materials in a variety of ways, making students the centre of learning activities; and reducing explanation and helping students of their high quality of students learning and sustainable forever from curriculum orientations (Department of Basic Education Commission, 2009).

This research study, titled "Developing Local Curriculum Framework on Water Resource and Disaster Course for Enhancing Students' Learning Achievements in the Basic

| Location of Ubolratana Dam | Upstream side of the Ubolratna Dam | Flood Plain at the Nam Pong River Basin in Khon Kaen | Students must be learning and knowing on the Natural Disaster |
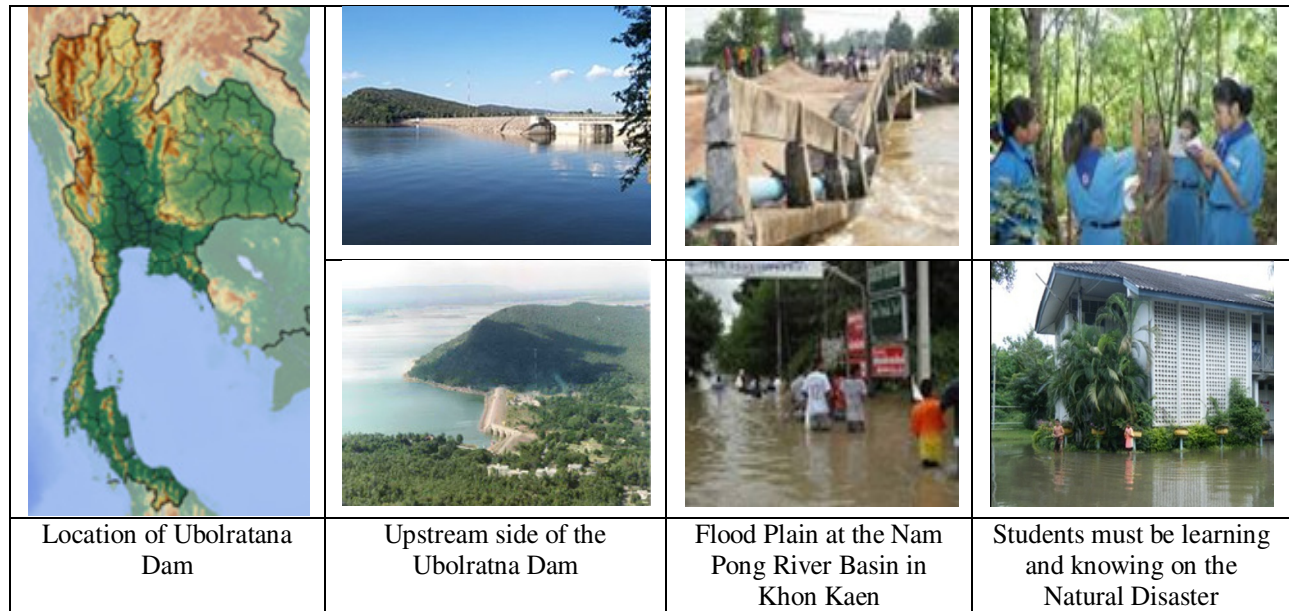
Figure 1. The Ubolratna Dam protects at Nam Phong River Basin launches on water floods and students ought to learn and protect from natural disaster.

Educational System", was launched in high-risk lower secondary schools in Thailand in 2013-2014 and is ongoing. The research study first aimed to secure recognition and understanding of natural hazards, including the potential impacts these can have on personal environments and social development. The research also aimed to develop water source and disaster prevention and mitigation knowledge and skills among families, schools, and communities, and knowledge of natural disaster response measures for extreme situations. The research approach is highlighted in Figure 2.

METHODOLOGY

Research objectives

1. To investigate the students' problems and needs for developing the local curriculum framework of the basic education commission.
2. To develop the local curriculum framework of the basic education commission.
3. To plan for interaction of students with instructional content of training teacher curriculum framework on learning units.
4. To compare the effects of using the curriculum framework between training teachers for using curriculum framework and conventional learning curriculum.
5. To compare learner achievements by means of comparison between this curriculum group and a conventional learning curriculum group with the curricular content concerning water disaster management for the different school sizes; large, medium, and small.

Sample Sizes

Step I: Research Process and Development

This study was administered in a randomly selected sample of 217

schooling directors and teachers, 12 professional scientists specializing in water resource management and water disaster, 9 professional educators specializing in curriculum and instruction with the purposive sampling technique for planning the new local curriculum framework to teachers' management for teaching.

Step II: To Tryout of the Curriculum Framework

To select the tryout sample size with the 5-secondary education teachers who were teaching on the science learning and social sciences groups, religions and cultures learning group to their students at grade level 9th in the Khon Kaen Primary Educational Service Area Office 4 and the Secondary Educational Service Area Office 25.

Step III: To Investigate the Curriculum Framework Efficiency

The curriculum framework efficiency was to administer with the sample size of 56 secondary education teachers, 2 separated groups of the 28-controlling teachers and the 28-experimental teachers groups with a multi-stage sampling technique, and 56 controlling students' group in the 3 classes and 79 experimental students' group in the 3 classes too at the same grade level 9 in the Khon Kaen Primary Educational Service Area Office 4 and the Secondary Educational Service Area Office 25.

Research instruments

1. The questionnaire on teachers' and students' perceptions of their responsibilities to their problems and needs when it comes to developing a curriculum framework on water resource management and water disaster content for learning and teaching.
2. The unstructured selection interview instrument used for teacher's and learner's interviews
3. The conservational guidebook instrument was reporting data records.
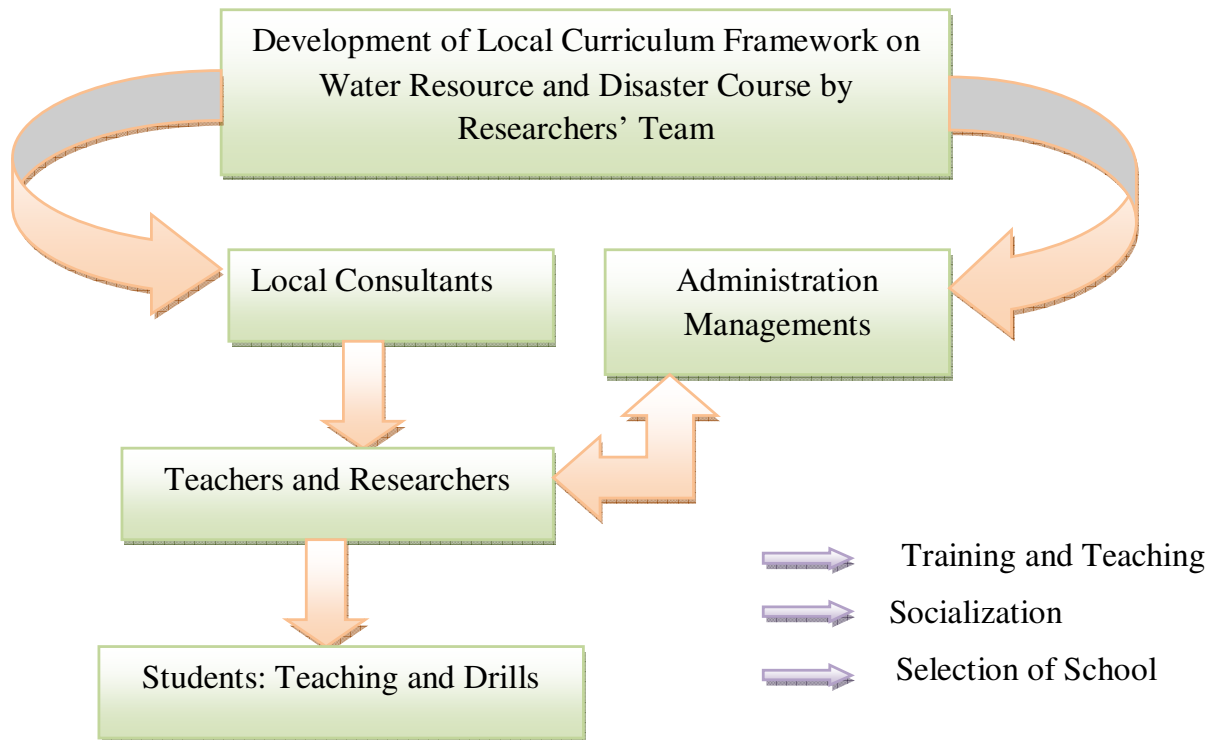
Figure 2. Development of local curriculum framework on water resource and disaster course in Lower Secondary Schools approach.

4. Training teacher curriculum document.
5. Practicing documents for training teachers
6. Pre and post training teacher tests
7. Training teacher satisfaction questionnaire instrument for teachers' perceptions on their satisfied training teacher curriculum framework.
8. Quality assessment document instrument was assessed to learning units of curriculum trainee.
9. The pre and post evaluations of students' achievements were assessed.

RESULTS

Teacher' and learner's perceptions of this curriculum framework on the 4 scales of school personnel, learning activities with teachers, innovations and learning sources, and assessment and evaluation scales, were of medium level quality. Teachers indicated that this curriculum framework held too few problems. The learning methodologies, instructional technique, teaching and learning process were to the satisfaction of the learner groups.

The local curriculum framework of participations in sequent steps onto introduction, recapitulation of learning purpose, the 7 Learning plans, such as; water resource, water basin resource, water resource management, natural disaster management, approach strategy policy on natural disaster management, local folk wisdom of water management, and specified keywords of water

resource and natural disaster management learning groups. The quality of students' outcomes and using the curriculum framework of the water resource and natural disaster management has to be transferred to the basic education commission, successfully.

The purpose of the teacher training curriculum framework was to develop the knowledge and ability of teachers to plan a learning unit on the water resource and natural disaster management. An experimental practice and training plan theory was used over 2 days with a training session over 3 days. Training instruments were composed of training curriculum documents, including; training a guide document; a trainee document; learning unit sampling; pre- and post- assessing tests; the teachers' satisfaction questionnaire; and the quality assessment on learning units. This study found that teacher's perceptions were confirmed with the guideline of the professional curriculum framework and Index of Item-Objective Congruence value (IOC) of 1.00 and appropriately average values of 1.00, and the quality assessment of learning unit making confirm with the Item-Objective Congruence value (IOC) of 0.96, and the teacher's achievement throughout of pre and post assessments with an Item-Objective Congruence value (IOC) of 0.97.

These results indicated that the problems of four respective levels of school personnel, learning and teaching activities, learning media and source, and

assessment and evaluation scales, were to some degree variable in efficiency. In terms of the learning and teaching problem scale, it has been indicted that teachers needs to teaching at the often alternative or high level of their learning unit of water resource and water disaster course to their high quality of teaching and needed to the format or technique, or methodology of their satisfactory teaching on learning unit group.

Focusing on developing the local curriculum framework, it includes an introduction, students' goals for their development, the seven-learning sub-content categories, such as; water resources, water basin sources, natural disaster administration, the approach strategy for natural disaster was administered, local folk wisdom in water management, and key words for water and disaster management sub-contents. The important factors of the local curriculum framework of water source and disaster content were used into educational institutes.

In terms of the training and practice, the curriculum framework for the course to students' learning units to their developing knowledge of students' contents and abilities were trained. Using the experimental workshop and training contents for students on 2-3 days with the 3 training topics, such as; training instruments, training texts, training guidebook, training trainee document, learning unit samples, pre and post assessing tests, the questionnaire on teacher satisfaction, and the questionnaire on teacher's curriculum unit quality. It was found that this curriculum framework conformed to the professional guideline of this curriculum, where the index of Item-Objective Congruence value (IOC) was 1.00; appropriately average values were 1.00; the quality assessment of learning unit making confirm with the Item-Objective Congruence value (IOC) was 0.96; the teacher's achievement throughout pre- and post-assessments with the IOC value was 0.97, and the questionnaire on teacher satisfaction indicated that the average IOC value (IOC) was 0.94.

Using the curriculum framework for training and practicing teachers, the 28-training teacher scores were more than 70%. Teachers were able to build the learning unit of the curriculum framework, water source and natural disaster courses; completely from 5 teachers who trained the learner groups and 23 teachers built the curriculum framework as high qualities. Focusing on teachers' perceptions of the questionnaire on teacher satisfaction, it was found that, overall their perceptions were too higher level.

Learner outcomes and achievements of their learning and normal learning to their local curriculum framework, using the learning unit of water source and natural disaster content of the two groups between the experimental learning and normal or controlling learning groups in the 3-school size as large, medium, and small school sizes. It was found that the experimental students' group had far greater learning achievements that the control group, and statistically significant differences were found at level .01, and students' controlling group at the 3-school sizes indicated that non significantly difference between different school sizes.

DISCUSSION

Discussion I: Research accordance

The results of this study indicates that the teachers' and students' responses of the problems and needs for developing the local curriculum framework of the basic education commission was to accordance of view points, especially, administrations of teaching and learning activities with the intervening informative of students' learning water source and natural disaster learning units. Teachers used the innovations or learning Medias and learning source, to emphasis for students' outcomes of their assessments. The data of personnel, learning and teaching activity methods, learning source, assessment and evaluation, and teachers' problems and needs these were reflected of teachers' teaching managements. Students improve on their knowledge and ability for their developing learning to their self-development, community, family, local, and to be use of their life forever. The Thai's government should introduce water resources and disaster content into the basic curriculum at the lower secondary level, because Thailand is located on at monsoon continent, and is likely to be faced with continuing floods and water-rerated disasters every year, with its greatest flood so far occurring as recently as 2011.

Discussion II: Research on developing local curriculum framework

In terms of the developing a local curriculum framework on the management of water sources and disasters for the basic education commission, it was found that the factors determined for school, community, and local community's needs of this local curriculum were as the introduction, goal and emphasizing development of learner, informative learning, students' assessment quality, the new local curriculum framework of water source and disaster contents into students were used and commented with the professional scientists and educators in the local area to uprightness and accuracy crisis, students' ability learning crisis, importance content and concernment crisis (Utthanan, 2009). This local curriculum framework is the first curriculum that satisfies the basic educational students at Grade levels 1–12, where the educational institutes apply for use and development to teaching and learning managements that followed as contexts, problems of students' needs, communities and local wisdoms. This result was confirmed with the studied of Padsin (2008), who reported the development of a learning unit on Lam Pao Flood Plain Environment school group.

Discussion III: Research on developing local curriculum framework

Focusing on the training and practicing of teachers in a local curriculum framework with learning units on the management of water resources and disasters for the basic education commission, This study indicates that the new local curriculum framework composes of the understanding knowledge development for teachers who are the leadership of this curriculum of their teaching, teachers' satisfaction and use are greater quality efficiency that these confirm with the core intentional curriculum government. Fullan and Stiegelbauer (1991) reported that teachers and connected personnel were the foundational factor propelling educational innovation and the curriculum successfully. Teachers should adjust their thinking and teaching to their understanding obstruction for modernizations.

Discussion IV: Research on efficiency for using local curriculum framework

These results indicate that the efficiency's using of a local curriculum framework to the management of water sources and disasters for the basic education commission for teachers and trainees are able to learn and invent the learning units. Teachers complete of their assessment to their training processes of the curriculum that follows as the dissemination of thinking, the importance and necessity of learning management framework for teachers and school administers, the directly emphasis on thinking of teachers' acquiescence, it was confirmed that Chaiyapan (2005) and Sittisomboon (2003) who reported the volunteer and network trainers' efficiencies were greater satisfaction and friendly of the curriculum unit for students' learning use who sat at Grade level 6 by the practicing curriculum processes.

Discussion V: research on students' achievements

To compare between the 2-learner groups of the experimental learning group and the normal learning group for assessing students' achievements who sat in the different school sizes; large, medium, and small schools. Of statistical significance were differences learning achievements between the two group, the experimental group was higher than normal group at level .01, with students' solving problem projects were presented and academic on water source and disaster exhibition of students were satisfaction from the communities and local folk wisdoms, for example; Drought in Our Home Project, Drought at Ubon Rattana Dam Project, Modernised Children on Nam Phong River Conservation Project. These students' projects confirmed with the studies of Silanoi et al. (2005) who reported of students' mind consciously to environmental conservation.

In the last decade, previous research reported that the students' achievements of their learning with the post-assessment were greater than pre-assessment; students' training and using the curriculum were more understanding learning activities than the conventional teaching. (Australian Qualifications Framework, 2011; Fullan and Stiegelbauer, 1991; Nuttrawong, 2010; Utthanan, 2009; World Bank, 2003).

SUGGESTIONS

Suggestion I: Policy Suggestion

Organizations, institutes, the Primary Educational Service Area Office, and the Secondary Educational Service Area Office ought to specify policies that support and promote the propagation of the local curriculum framework concerned with management of water sources and disasters of the basic education commission to manage and arrange a local flood or flood plain or drought areas for cultivating moral traits for primary and secondary educational students who are able to be emphasized on their acknowledge and appreciation to include experiencing skills. Students were being used the water responses and water management to adapt of their daily life. Students with their families and communities are able to apply this curriculum for the quaintly and sustainable of their life. Teachers should be trained and practiced in this local curriculum so as to promote the investigation, improvement and adaptation of their teaching within the core curriculum system. Educators and professional occupations should investigate a local curriculum framework for suitability and possible of students' achievements. Using the curriculum framework policies was to apply suitably of the natural disasters and drought situations for local area and regional contexts to human source and communities' necessary for protecting and affecting the natural disasters in differentiated of time and learning on types of disaster by the training professional participators and assessors from specify supervisors.

Suggestion II: Applications on Using Curriculum Framework

In terms of the applications for developing and using a local curriculum framework on management of water sources and disasters such as this for the basic education commission, the Primary Educational Service Area Office, along with the Secondary Educational Service Area Office ought to be planned and administered of the curriculum for educational institutes to cautious and covers of sub content of the core curriculum. The use of curriculum framework documents ought to confirm to the needs of school and the community. Human resources ought to be developed continually and seriously for their knowledge, skill, and experience in teaching and learning

management, which it follows as the local curricular framework of this content. The administration supports the curriculum prototype, understands the point of straightly and weakly of this curriculum, participates of students, revises data assessment, and learns from personnel suitability by the organisation or educational institute to solve the problems and obstructions of students' playfully. School administrators should build a friendly school environment in cooperation, and plan towards sufficient budgets for developing school curricular on management of water sources and disasters on behalf of the basic education commission.

Suggestion III: Suggestion to Present that Based on the Research Objectives

Because the objectives of this research are to investigate the students' problems and needs for developing the local curriculum framework of the basic education commission, researchers and educators emphasize high standards as an important factor in improving the quality of education for all students. As a result, schools and districts are looking at ways to develop a high-quality curriculum that is based on the core curriculum standards of education in Thailand. An important starting point for this effort is a carefully thought-out curriculum framework that reflects the developments and goals for which the education community is willing to be held accountable. Developing a standards-based curriculum requires changes in the way teachers teach and schools are run, so care must be taken to build capacity for all educators and to provide adequate time for implementation, monitoring, and evaluation of the curriculum. The curriculum-development process also should provide opportunities for reflection and revision so that the curriculum is updated and improved on a regular basis.

In terms of the second objective is to develop the local curriculum framework of the basic education commission, problems and issues of concern included the provisions, application process and outcome of the curriculum. The problems identified were confusion and uncertainty in preparing school curriculums; schools' ambition in prescribing learning areas and expected outcomes; measurement and evaluation did not correlate with the standards set, which effects on preparation of certifying documents and transferring of learning outcomes. Furthermore, issues of learners' quality resulting from acquisition of essential knowledge, skills, capacity and desired characteristics and attributes were quite disconcerting.

Focused on the third objective is to plan for interaction of students with instructional content of training teacher curriculum framework on learning units. Most Thai students learn the basic core curriculum facts and formulas but many of them are unable to use this knowledge to solve everyday problems. Teachers participated in the creation and review of the standards for the

curriculum framework on water resource and disaster content for enhancing students' learning achievements through their professional organization. Many teachers and many schools communities-both prior to and subsequent to the release of the standards in the basic core curriculum of education of Thailand 2008 have tried to provide the meaningful learning experiences implicit in the standards.

Finally, to suggest of comparisons between the effects of using the curriculum framework for training teachers and conventional learning curriculum, integrating standards into this curriculum is a complex endeavor that brings added dimensions to the curriculum-development process. Traditionally, the school curriculum provides a plan of instruction that indicates structured learning experiences and outcomes for students. It specifies the details of student learning, instructional strategies, the teachers' roles, and the context in which teaching and learning take place. More recently, however, the standards movement, research on teaching and learning, and research on the characteristics of successful schools ought to have broadened the scope of curriculum to include everything that affects what happens in the classroom and consequently affects student learning.

Suggestion IV: Further Research Suggestion

It is suggested that the further research lead this local curriculum framework to be administered throughout educational levels, and it ought to develop continually. The suitability of this curriculum framework may change to follow as the time and modernisation data to adapting detail of a new effect for the new curriculum along with content changes. The new curriculum should study effects and determinants of following this curriculum so as the conformation to take this adaption and improvement of the curriculum to merit and limit of learning management and process to other learning subject groups.

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

Development of the inner wisdom development programs with Buddhist doctrines to improvement of self-mindedness for bachelor educational students

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To investigate inner wisdom development programs with Buddhist doctrines of 508 educational students and 104 lecturers, a wisdom test, diary short note, interview, and observation were used. The principle of Specific Conditionality; the 5-Aggregates, Rule of 3-Characteristics, and practice of 4-Foundations of Insight Meditation were needed. Inner wisdom skills perceived greater actual students considered with the student's views. The mindfulness practice and meditation increased gradually, distracted, bad-tempered to serene, relaxed, relieved, physically fatigued to fresh and active activities worthwhile of students were higher of students' satisfaction. The knowledge aspect, students gained knowledge in 4-Elements and 5-Aggregates, understanding changes and emerges, existing and ceasing causes of their feeling aspect. Students' participations were too happiness, warmness, relief to their awareness and thinking distraction and concentration, controlling their temperament of their inner wisdom training program was at excellent level. Regarding students at the moderate's condition, problems and needs, lecturers' opinion toward inner wisdom based on Buddhist principles were provided. Statistically significances were differentiated between the pre- and post-training intelligence and the inner wisdom of the control and experimental groups revealed at the .01 level, and the relationships to the overall satisfaction of students toward their training program for developing inner wisdom was found.

Key words: Inner wisdom, development programs, Buddhist doctrines, and bachelor educational students

INTRODUCTION

Buddhism in contemporary Thailand

In contemporary Thailand, Buddhism is the state religion of the country. Under the constitution, the King as a symbol of the nation, Bust is a Buddhist. The Crown and the State have always been involved in supporting and assisting the ordained sangha and in promoting Buddhism among the people. According to the latest

census, with a total population of 63 million, approximately 94% of Thais are Buddhist. As of 2002, there were 32,000 monasteries, 265,956 monks and 87,695 novices in the Kingdom. Besides numerous forest monasteries where monks may go for extended meditation, there is a monastery in nearly every village and there are many more monasteries in the cities. Schools and Universities are often located on monastery grounds, and the Sangha is actively involved in the efforts of the state to raise the educational level of the people as a whole. Buddhism and the Sangha, therefore, are deeply intertwined with the daily lives of the people of Thailand. For this review, several permutations of Buddhism, dharma, and mindfulness were used to search for the descriptors of dharma practice, or the practice of Buddhist teachings, interchanged with the keywords of personal growth or development or self and professional or professional growth or development (Wikipedia, the Free Encyclopedia, 2014).

Buddhist education

In Thailand, modern Buddhist education is provided by two Buddhist universities administered by monks. They are Mahachulalong kornrajavidyalaya University and Mahamkut University. Both of them are state universities, receiving financial support from the Thai government, and both have Baccalaureate through Doctorate programmes open to both ordained and lay people. In order to provide Buddhist education in the schools, the Thai Sangha has persuaded the Ministry of Education to mandate the teaching of Buddhism to all students from grades 1-12. Local school districts, however, were left to formulate their own curriculum, although the level of understanding of Buddhism in the local districts may be quite informal and even inaccurate in some cases. The curriculum for grades 1-12 includes the life of the Buddha, Jataka stories, the basic teachings of the Buddha, and an introduction to the Tipitaka and to Buddhist vocabulary. It is designed impart an understanding of the Sangha and of the Duties and roles of monks. Besides the educational value of the effort, we believe that the curriculum will promote Buddhism by exposing the children to its precious teachings, and will protect Buddhism by ensuring that the children are given an accurate account of those teachings.

Religious practice

The major issue related to Buddhist activities is meditation practice. In Thailand, meditation is taught to, and practiced by, both ordained and lay Buddhists, at various centres and monasteries throughout the country as well as at home. Understanding religious practice in terms

of observing the Vianaya for ordained and pancasila for laity, trainees have to admit the fact that rapid modernization has brought about social disintegration and a precipitous decline in personal morality. Buddhists are not immune to this, and rampant sexual misconduct, violence, crime, and drug abuse, indicates that the laity are no longer able to keep sila very well. It is necessary to call for a return to personal morality and self-discipline. The fact that the decline in morality is precipitated by rapid changes in the social order indicates that calls for greater self-discipline are necessary. In response to globalization, Buddhist promotion must also build global networks of Buddhists working together for the benefit of the world. That is to say, perhaps, that people must enter into the globalization process itself in order to bring Buddhist values to it.

Well-being: Buddhist Perspectives on Buddhist Psychology

Buddhist thought of well-being is taken as a representative of an eastern perspective. Buddhism represents a view of personality and describes methods for its growth into a particular form of perception. Abhidhamma, a psychological account of Buddhism was developed based on the insights of Buddha in the fifth century B.C.E. Abhidhamma contains an ideal type of the perfected personality around which its analysis of the working of the mind is oriented. The basic method Abhidhamma offers for studying the mind's multitudinous changes is introspection, a close and systematic observation of one's own experience. Mental factors "*kamma*" according to Abhidharmma are the key for happiness and well-being. *Kamma* is the principle that every deed is motivated by underlying mental states. The following is derived from various sources on Buddhist psychology.

Another important unhealthy mental factor is perplexity (*vicikiccha*) that denotes the inability to decide or make a correct judgment. Other unhealthy cognitive factors are shamelessness (*ahirika*) and remorselessness (*anottappa*); these factors allow a person to disregard the opinions of others and one's own internalized standards. In fact these factors make the person commit evil acts without compunction, and so he is apt to misbehave. Egoism (*mana*) is another important unhealthy cognitive factor where the self-interest causes a person to view objects solely in terms of fulfilling their own desires or needs. According to Abhidhamma the concatenation of these three factors in a single moment - shamelessness, remorselessness, and selfishness - is undoubtedly often the basis for much human evil.

Abhidhamma places lot of importance on mindfulness (*sati*), besides insight for healthy mental state. Mindfulness and insight are responsible for other healthy

factors to develop concomitantly. The presence of these two healthy factors is sufficient to suppress all unhealthy factors. To have a healthy mental state requires a certain circumstance to arise. The twin cognitive factors of modesty (*hiri*), which inhibits shamelessness, and discretion (*ottappa*), the opposite of remorselessness, come to mind only when there is a thought of an evil act. Further, modesty and discretion are always connected with rectitude (*cittujukata*), the attitude of correct judgment. Confidence (*saddha*), a sureness based on correct perception is another important health factor. According to Abhidhamma the group of healthy mental factors - modesty, discretion, rectitude, and confidence - act together to produce virtuous behaviors as judged both by personal and social standards.

Mindfulness practice for general people and students in institutes

Rajabhat Maha Sarakham University is located in Muang District of Maha Sarakham Province, in the heart of Northeast Thailand. The University prides itself in having trained its students to become graduates in the field of education, as well as other professions who serve in a variety of sectors in many parts of the country. Since its establishment in 1925, the Institute has played an important role in the development of the community and the region, It has been part of the name Muang Takasila, which is used to refer to Maha Sarakham as a prominent source of education where people can seek knowledge of various disciplines. The Institute plays an active role in education and strengthening the community by offering courses and programs that blend universal bodies of knowledge with local wisdom. In so doing, the Institute makes use of appropriate technology, consistently upgrades its staff development, and offers quality higher education programs under a quality assurance system. Through commitment of personnel at all levels, the Institute seeks to achieve academic excellence in offering and implementing programs that also nurture in the students love and appreciation for their local and national heritage, as well as an awareness of universal cultural understanding on nurture in students awareness, pride, and values of local and national cultural heritage is the important mission (Rajabhat Maha Sarakham University, 2014).

Teacher student's Bachelor of Education, Faculty of Education, Rajabhat Maha Sarakham University is one of the Education's core teacher education programs, and focuses on initial professional studies in early childhood, primary, and secondary educations for preparing teacher in school in Thailand. The course covers all areas of bachelor curriculum including English language, physics, chemistry, biology, local music, Chinese language, special education, mathematics, science, arts, social education,

health and physical education, computer education and technology, and contains a strand of 4 years and training teaching at the school in 1 year which provides the opportunity to build breadth of knowledge in areas of teacher in the future. The aim is for students to be professional teachers who see themselves as being responsible for the intellectual, physical, social, emotional, ethical, spiritual and aesthetic development, and wellbeing of bachelor students. Study towards a creative, rewarding and challenging career and develop your skills in communication, leadership, organisation, management and information technology, especially, they must have selves-mindfulness practice to develop themselves with the Inner Wisdom Development Programs by Buddhist Doctrines for improving of self-mindedness in the first at the freshly bachelor educational students.

The qualities of the relationship and the dynamics that transpire between these participants have an important bearing on therapeutic change, because students serve as the forum in which and through which the professional expertise of the personal experiences of the clients(s) interact (Sprenkle and Blow, 2004: 145). Traditional Buddhist practices teach how to intentionally calm the mind (self-monitor) and increase awareness. Mindfulness, one form of meditation practice, is often defined as intentionally noticing and staying present to whatever is being experienced in a non-judgmental way (Kabat-Zinn, 1990). Mindfulness and other meditation practices, such as tonglen (sending care and kindness to others, and taking in suffering from others to oneself), loving kindness and compassion practices, and forgiveness practices are beginning to permeate tradition. Segal et al. (2002) are also founded on Buddhist practices of focusing intention, attention, and allowing experience to be as it is without the amplifications of patterned minds and mental habits.

Inner wisdom

Inner wisdom is that part of everybody which is beyond our rational, logical and conscious mind. It's generally brought up to believe the mind is their primary source of information with regard to the world and who learn little, if anything, of their "other" nature. This "other" nature is their inner wisdom and is reached through their deeper intuition, instinct, hunches and the validity of their feelings. This is their inner voice, their inner wisdom (Dawson, 1991). Everybody connects with their inner wisdom in a variety of ways, often without even knowing that they do so. Have you ever picked up a book, opened it at random and read a sentence that has a powerful effect on you? Or perhaps the whole book does. Someone may say something in conversation that strikes a deep cord in you or you may experience profoundness

from watching a beautiful sunset or walking in nature. However, they can greatly increase their ability to contact their inner wisdom and this includes their being aware of some of the obstacles which normally prevent them from doing so (Lewis, 1995).

Providing education is cultivation and instilling good things deeply inside, and those good things later project their values outside. It is not education that is concealed (Amornwiwat, 1999:17). This is in harmony with Wasi (2011: 16) who states that the main shortcoming of the present education is the study of knowledge or the subject that is external which does not cause any change inside the mind of the learner. Even the education relating to the mind, it is the study of knowledge about the mind that does not make the mind better. Therefore, in education, learning the nature of all things cannot be successful by using the subject as the base, because if the subject is used as the base, learning will be separated into parts and it is the matter of the outside. Instead, the mind of the learner must be the base for all of the learning to be connected to knowing and developing one's own mind (Amornwiwat, 1987: 21). Amornwiwat (1999) states that students in general tend to understand only slightly that education is teaching student's knowledge and one who possesses knowledge can do things such as reading, writing, calculating, and be successful in taking up a job. Educational measurement and evaluation, thus, aim at measuring what the student does and what the student can do. Measurement of practicability has not been much enough. Measurement of attitudes, virtues, and personality is even less. What we should be most worried about is that graduates from higher education had so little opportunity to practice self-analysis, to correct and train them to be highly virtuous before their graduation and going out to face the wide world with confidence.

EDUCATION ON PSYCHOLOGY AND BUDDHISM WITH INNER WISDOM PROGRAM

For many decades the psychology circle has paid more attention to Buddhism because Buddhism has practice for good movement of the mind rather than trying to understand it through ideas and theories. This helped the psychologist to use Buddhist concepts to enhance the science of psychology harmoniously. Master Phra (2013: 10) states that education with virtues/ethics is learning by direct experience. It decreases stress and helps to rehabilitate the inner condition by the practice of mindfulness. Christopher (2012: 121-122) explains that the practice of mindfulness or insight meditation (mindfulness) has the role of decreasing delusion or preventing it from taking place, and the role of paving way for the emergence of wisdom and components of wisdom has long been a Buddhist way of practice, such

as understanding of impermanence of all things in the world which is the foundation of suffering. Venerable Dhamapitaka (2003: 93–94) states that living with wisdom means being aware of the state and making use of the nature, living in harmony with the nature. Living freely means not being under the power of craving attachment, or living without attachment. Life with wisdom therefore can be seen as having two sides; the inside is calm, cool, relieved, and cheerful with awareness, be free; the outside is agile and is always ready to get involved and deal with all the things as they are with pure reasons, without a complex or attachment.

In conducting this research, the Buddhist doctrines were used, emphasizing the wisdom by studying the inner wisdom which reflects understanding of the ultimate truth that all things are connected and depend on each other. The inner wisdom reflects knowing what one's own thought is up to, having mindfulness to control the sense-object, when one faces any problem, the wisdom helps him to understand that problem as it is. He is able to manage and relinquish that sense-object without blaming himself. Blaming oneself brings about lamentation in the mind. Management and relinquishment of sense-object employed Buddhist doctrines which are: 1. the Five Aggregates, to help one understand how the body, the mind, the thought and the feeling work together; 2. the principle of the Three Characteristics, to help one understand that all things are not stable, not sustainable, so one should not cling to anything; one should make his mind free from any attachment, be cheerful and free; and 3. the principle of Specific Conditionality, to help one understand that all things are related and depend on each other. This helps create deep respect, gratefulness, sympathy, and helps one see values of things. All these employed group activities, lectures, fact sheets, work sheets, videos, nature study, and brainstorming together with the practice of the Four Foundations of Insight Meditation which comprises: having mindfulness to follow the body, having mindfulness to follow the feeling, having mindfulness to follow the thought, and having mindfulness to follow the sense-object. This is consistent with Master Phra Thich Nhat Hanh (2013: Lecture on Buddhist Doctrines) who states that the practice of mindfulness will help us to know the 5 components inside ourselves better. We cannot be a good teacher if we cannot release the pain. The practice of mindfulness will help us to relieve the pain. A good teacher must know how to relax and must learn the suffering in order to sympathize with others. If we know how to develop ourselves, rehabilitate ourselves, we will be able to help others as well. These characteristics are very important for teacher students and therefore the inner wisdom is important and so necessary that it must be developed within the teacher students. If we have quality teacher students, then they will later build their own quality students in the future which will help make the national development

sustainable (Kalupahana, 2006).

Students supporting and emphasizing mention studies with the inner wisdom program

Finally, the Rajabhat Maha Sarakham University commitment to the Buddhist philosophy of searching for harmony, self-creating, and self-fulfillment through serving others creates a fundament for unique educational space, where learning is an intrinsically motivated process of individual development as a personality. Although supplying the individual with baggage of practical skills and theoretical knowledge, the University reaches the same goal as other "Learning by practice" strategies, but in doing so it is not ruled by the social contribution pragmatism of producing a competitive work force, rather it is concerned with each individual's growth as a human being. In this context the role of the university in 21st century may be reviewed not only as an institution giving specialized knowledge and preparing for the challenges of life, but also as a place flourishing with bachelor educational student growth and development.

Research aims

1. To investigate the problems and needs of the educational students and teachers for developing the Inner Wisdom Program with Buddhist Doctrines in Rajabhat Maha Sarakham University
2. To invent the Inner Wisdom Program with Buddhist Doctrines for assessing the educational students in Rajabhat Maha Sarakham University.
3. To develop inner wisdom of the educational students in Rajabhat Maha Sarakham University.
4. To examine the satisfactions of the educational students of their training on the Inner Wisdom Program with Buddhist Doctrines in Rajabhat Maha Sarakham University.

METHODOLOGY

Procedures

The research employed research and development methodology to construct and develop an inner wisdom development program for teacher students of Rajabhat Maha Sarakham University. The research was divided into 4 phases as follows:

Phase I: Research Instrument on the State, Problems and Needs of the Inner Wisdom Questionnaire for Students' perceptions on their Classes

Step 1: The study of baseline data for the inner wisdom development program

1. The study of related documents and research works for the

preparation of data for the inner wisdom development with Buddhist doctrines, focusing on the topic of "the inner wisdom"
2. The compilation of experts' ideas through a focus group discussion in order to obtain concepts for the construction of questionnaire, the state, problems, and needs of inner wisdom development with Buddhist doctrines and the content of the inner wisdom to be used in the development of activities and media, and other ideas from 7 experts. The framework of the inner wisdom was set to be in the 3 principles as follows:

1. The principle of specific conditionality, for inner wisdom development that deals with creating understanding of the ultimate truth.
2. The Five Aggregates, for inner wisdom development that deals with awareness.
3. The Three Characteristics, for inner wisdom development that deals with relinquishment of the sense-object.

The constructed questionnaire was then evaluated by 5 experts of psychology and evaluation. Its validity was determined at .06 -1.00, the discrimination power range was 0.21-0.71, and its reliability was 0.85.

Figure 1 depicts the profile model of conceptual framework on the first phase recently, provided by the authors to a step of authors' methodology on the Phase I. The researchers were participated in a recent data collection from the documents, research journals, senior professional educators, and others. This diagram in Figure 1 suggests that this researchers' ideal would exhibit greater leadership and understanding this research arrangement and development to next phases (see in Figure 1).

Step II: Group Discussions

In the focus group discussion, the experts gave their perceptions on the state, problems, and needs of the inner wisdom development in two points. Qualitative data were treated by using Content Analysis and Triangulation. The basic statistics used in analyzing the data were mean (X) and standard deviation (S.D.) and t-test.
1. To collect the data on the state, problems and needs of inner wisdom development from the lectures and students, there were 2 questionnaires: The first questionnaire was for the lecturers. It had 2 parts: the questionnaire of the state and problems in inner wisdom development, and the questionnaire of the needs of inner wisdom development. The second questionnaire was the 3-parts; the questionnaire of the state and problems in inner wisdom, the questionnaire of the needs of inner wisdom development, and a behavior survey.
2. The inner wisdom development program contained 2 parts: The practice of the Four Foundations of Insight Meditation, and group activities.
3. According to the interviews of experts, inner wisdom based on the Buddhist principles is an individual's inner capability to handle problems with intuition of the truths that things exist, arise and cease; and to be aware of one's own physical conditions and thoughts with a stable mind that perceives an emotion as it is without being judgmental but able to deal with it and let it be, not being attached to any emotional state nor responding to it in considering anything. Rather, development of one's inner wisdom should involve the person through the following developmental stages: Precepts (Sil) for controlling the behavior, Concentration (Samadhi) for controlling the mind, and Wisdom (Panya) for solving problems and recognizing the truths. All these need practice in meditation to acquire inner wisdom.
4. Reviews of the related literature provided the following two major
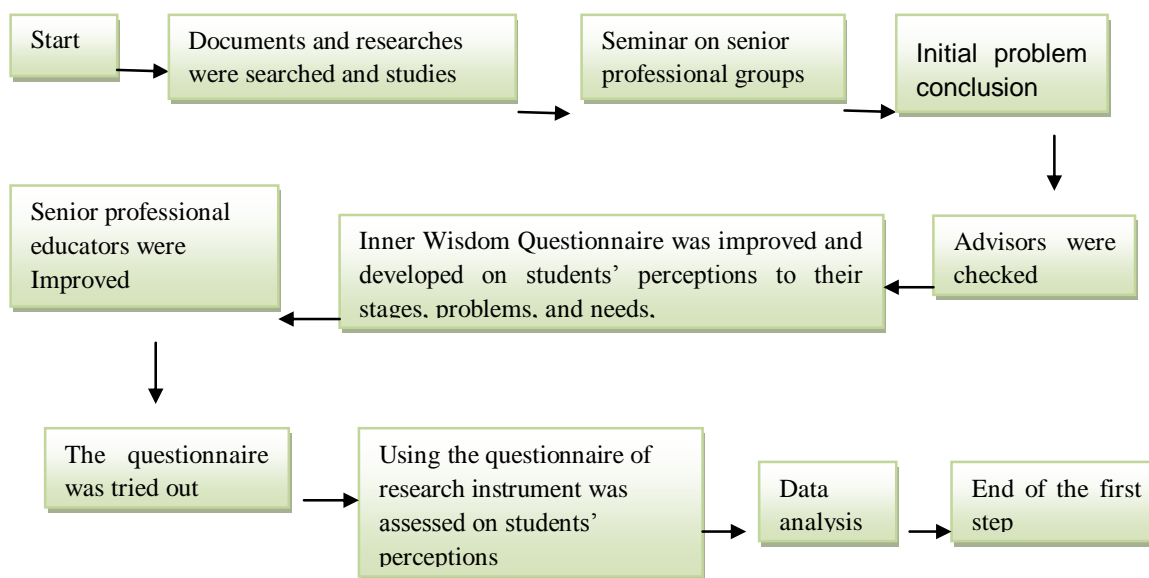
Figure 1. Model of conceptual framework on the first step.

Buddhist principles:

The Dhamma Principle

1. The Ultimate Truth, such as; Focus on understanding the truth of every existence and Understanding relationships of causes or factors of all existences
2. The Five Aggregates or Mindfulness, where as composed with Focus on awareness, Understanding origination of physical beings and reducing defilement, and Understanding causes of thoughts and feelings.
3. The Principle of Equanimity that are followed as The Dhamma Principle with focus on letting go defilements, Changes of all existences, and Acceptance of existing, rising and ceasing on Detachment
4. Practice: Training on awareness-- physical, mental spiritual perception that ought to Concentrating on considering Physical feeling within the body, inner perception within emotions and feelings, mental perception within the mind or thought (consciousness), and perception of *mental objects* or Dhamma, that is the truth, seeing things as they are.

Phase II: Developing the Inner Wisdom Development Programs with Buddhist Doctrines for

Educational Students

Step I: Training Development Program

For developing the inner wisdom development programs, researchers were arranged and managed the guideline onto 4 sub steps

1. This program was composed with the Training package name, Purposes, Content, Schedule table, Training activities, Medias, and Assessment documents, such as; Exercise document, Observation form, Daily short note, and Assessing program test.
2. Advisors should be checked and advised to this program, researcher was improved
3. Senior Professional Educators should be checked and advised to this program, researcher was improved.
4. This program was going on work, completely, it's called the Inner Wisdom Development Programs.
5. The Inner Wisdom Development the Contents Buddhist Principles, namely; the Ultimate Truths, the Five Aggregates or Mindfulness, and the Principle of Equanimity. In terms of Practice of Buddhist Principles, Satipatthana 4 (Four Foundations of Mindfulness), which example practicing Mindfulness with Training Program consisting of: title of the training program, Objectives, Contents, Length of Training, Training Activities, Instructional Media, Evaluation, and Orientation.
6. Focused on Understanding and Establishing Good Relationships Program, student should be Understanding the truth of existences, Seeing things as they are on Program 1: Understanding the truth of existences, Not seeing things as they are Program 2: Awareness on Physical movement with still mental state and the Real Self, Letting Go Emotions with Change is the truth, and Letting Go Emotions with Unhappiness is normal in life.

Step II: Training Administrations with the Development Program on the Sample Size

Focusing on using the Inner Wisdom Development Programs were assessed students' perceptions of their Buddhist Doctrines course for educational students in Faculty of Education in Rajabhat Maha Sarakham University. These programs composed with the Wisdom Test, the Interview Form, and the satisfied assessment Test.

The effectiveness of the inner wisdom program

This section shows the effectiveness of the inner wisdom program
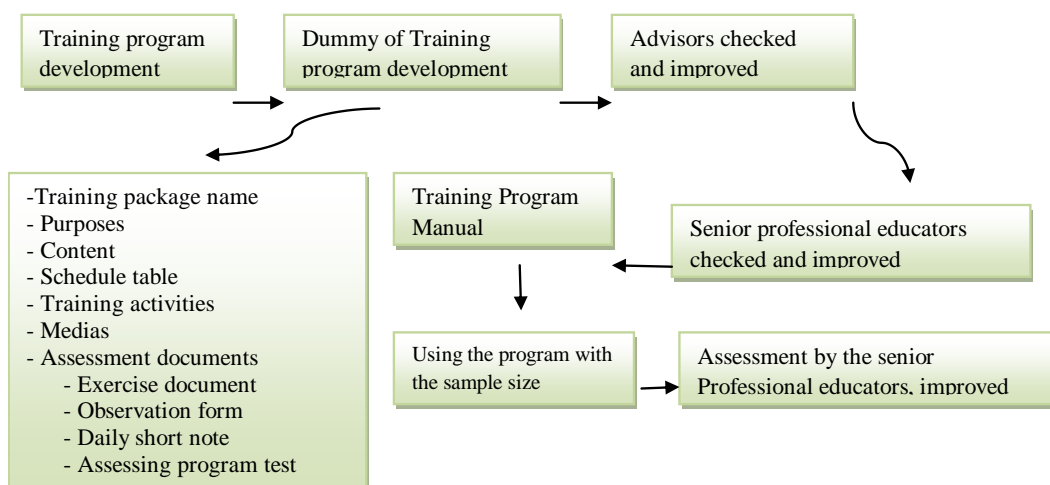
Figure 2. Model of conceptual framework on the inner wisdom development programs.

with the senior professional educators who were advised; researchers improved and analyzed these programs by using the Inner Wisdom Development Program in this research, perfectly (Figure 2).

The sample group consisted of 30 B.Ed student volunteers studying in the academic year 2013 at Rajabhat Maha Sarakham, and these students were divided into the experimental and control groups of fifteen. Data were collected by using a test of inner wisdom, an interview form, students' daily recording form, a behavioral observation form and a program evaluation form. These instruments used in collecting data were the following:

1. The intelligence test was constructed by Dansilp (2007: 208) with discrimination power of 0.35-0.71 and reliability of 0.94.
2. The program for training inner wisdom based on the Buddhist principles was constructed during Phase II by the researcher and consisted of 10 modules assessed by experts with IOC of 0.6-1.0; while the program quality was examined by another group of experts, evaluating its quality in 4 standard areas: propriety, feasibility, utility, and accuracy. Findings reveal that the overall quality of the training program is highly appropriate ($\overline{X}$= 4.38, S.D. = 0.71)
3. The structured-interview form, used for in-depth interviews of the the B.Ed students participating in the inner wisdom training, was aimed at inquiring about their knowledge, thoughts, feelings, experience, and their knowledge applicability; and this structured-interview questions had been assessed by experts as having congruence with the objectives.(IOC = 1.00).
4. The evaluation of the training program

The results of this study were analyzed; the module was developed on with six lessons, and checked for its content validity, consistency, and language usage by five experts. The Index of Consistency (IOC) was calculated.

1 Activities having IOC of 0.6-1.00
2 length and venue of training having IOC of 0.6-1.00
3 knowledge and understanding having IOC of 0.6-1.00
4 knowledge applicability having IOC of 0.6-1.0
5. The Behavioral Observation Form, assessed by experts as having IOC of 1.00, was used for observing the participating students' behaviors in two aspects: mindfulness practice and group-activity behavior.

6. The Students' Daily Record Form, assessed by the experts as having IOC of 0.80 – 1.00, was used to record two aspects: the daily experience gained by the student and the daily result of their practice.

Phase III: Using the inner wisdom development programs with Buddhist doctrines for educational students assessments

In this phase, using the Inner Wisdom Development Programs with Buddhist Doctrines for assessing the educational students; it is followed as:

Step I: Training Students' Processes

Researchers managed to use the Inner Wisdom Development Programs with Buddhist Doctrines with the process of training students first.

Step II: Assessing Trainee Students

Students' experiences and training activities were assessed with the wisdom test, training program assessment, interview form, daily short note, and students' satisfaction questionnaire (Figure 3).

This step shows the psychometric values of the Model of the Inner Wisdom Development Programs, the research instrument used for measuring attributes like reasonably simple. These are all physical and observable traits that students and teachers can assess objectively. Traits such as personality, intelligence, attitude, and beliefs are important characteristics for measurement and assessment.

Step III: Analyzing Trainee Students

Lecturers checked the scores of students' responsibilities and if students do not past the crisis score, they must improve themselves.

Step IV: Advisors were checked

Students' outcomes and performances were taken to the advisors for improvement.
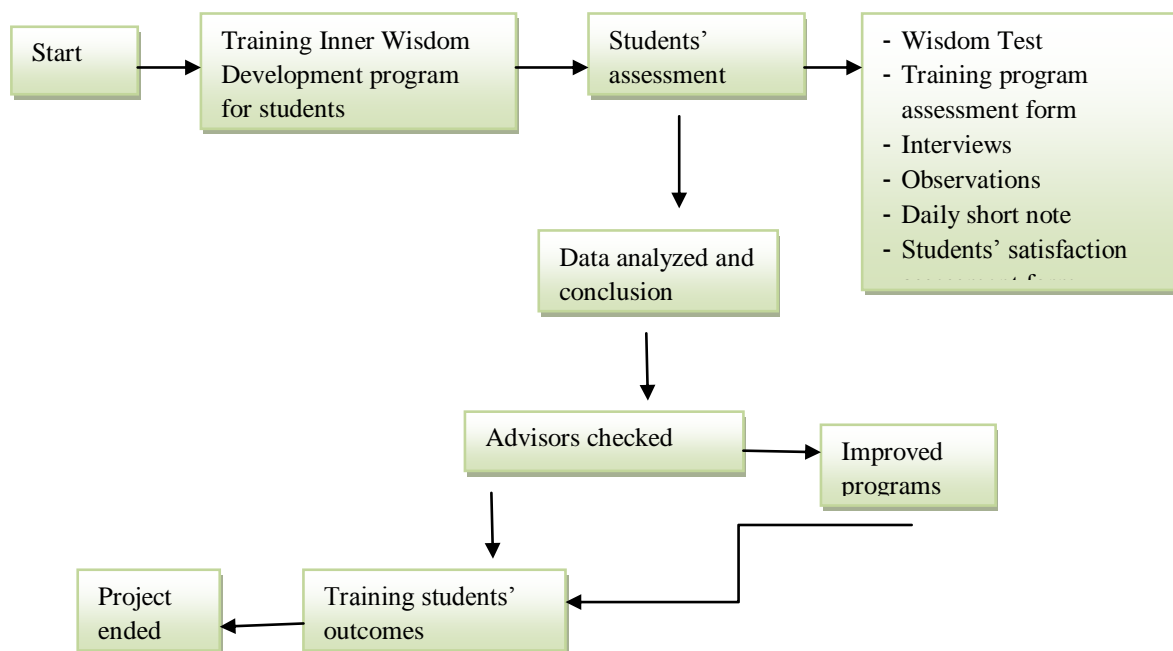
Figure 3. Model of the inner wisdom development programs with Buddhist doctrines for educational students assessments.

Step V: Students' outcomes

In terms of bachelor educational student outcomes typically refers to either (1) the desired students' practicing improvement of self-mindedness with the Inner Wisdom Development Programs on Buddhist Doctrines that institute and teachers want students to achieve in the educational, societal, and life effects that result from students being educated practice. In the first case, student outcomes are the intended goals of a course, program, or training experience in Buddhist Doctrines; in the second case, student outcomes are the actual results that students either achieve or fail to achieve during their education or later on in self-mindedness. The results of this research were determined and affected the educational students, satisfaction and showed to the students' outcomes of their Inner Wisdom Development Programs with Buddhist Doctrines, understandingly.

Figure 3 shows the making steps of the model of Inner Wisdom Development Programs with Buddhist Doctrines for Educational Students Assessment Form, these steps were made the research instrument for assessing students' perception of their inner wisdoms to their outcomes and performance with the instrument assessment.

Phase IV: Students' satisfaction on the inner wisdom development programs with Buddhist doctrines

In this phase, making the Satisfaction Questionnaire was administered on students' perceptions to their Inner Wisdom Development Programs with Buddhist Doctrines for assessing the educational students' satisfaction, it's followed as:

Step I: Training Students' Processes

Researchers were managed for using the Inner Wisdom

Development Programs with Buddhist Doctrines with the process of training students at the first.

Step II: Assessing Trainee Students

Assessing students' satisfactions and quality of training activities with the Satisfaction Questionnaire were built.

Step III: Analyzing Trainee Students

Lecturers checked the scores of students' responsibilities of their psychological perceptions.

Step IV: Advisors were Checked

Taking the students' outcomes and performances to the advisors who were advised and researcher was improved, exactly.

Step V: Students' Outcomes

The results of this research was determined and affected of the educational students, satisfaction and showed to the students' outcomes of their Inner Wisdom Development Programs with Buddhist Doctrines questionnaire instrument, successfully.

Figure 4 shows the making steps of the model of the Satisfaction Questionnaire Instrument on Inner Wisdom Development Programs with Buddhist Doctrines for Educational Students' Perception Form, these steps were made the research instrument for assessing students' perception of their satisfaction to their inner wisdom with Buddhist Doctrines.

Sample size

To develop the Inner Wisdom Development Programs with Buddhist
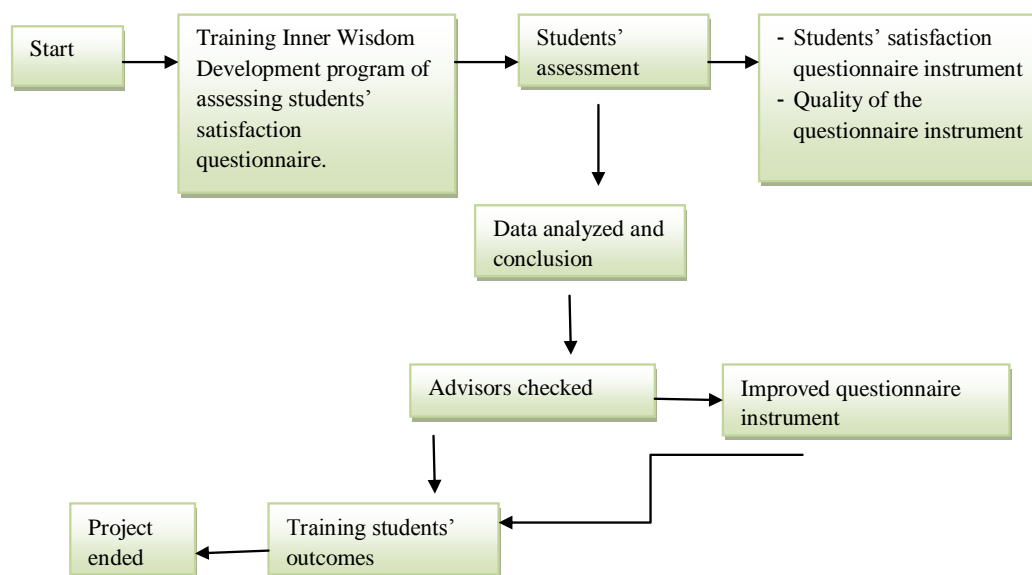
Figure 4. Model of the satisfaction questionnaire instrument on inner wisdom development programs with Buddhist doctrines for assessing educational students' perceptions.

Doctrines for educational students was used; the Focus group discussion was complied with a sample size of 7 senior professional educators, the Questionnaire on Teacher and Student Interaction of their perceptions were administered with a sample of 104 educational teachers and 508 educational students in 10 program classes in the Faculty of Education in Rajabhat Maha Sarakham University in the first semester in the academic year 2013.

Data analysis

Using foundation statistics; mean average and standard deviation were used to analyse the student's responses to their desirable qualifications thereby assessed. Associations between the students' responses on a inner wisdom model that was built from the Wilcoxon statistic' form. Testing the hypothesis, comparisons were made between student's self-mindedness of using a developing model of bachelor teacher student's form of their responses and the Form of Normal experience learning activities with the Mann – Whitney U - test statistic.

Research instruments

The Inner Wisdom Development Program Instrument

Inner Wisdom Development Programs instrument was complied on 2 parts; teachers' perceptions of their statuses, problems on development of the inner wisdom program, and teachers' needs. In term of the questionnaire for students' perceptions were composed with the 3 indicates; student's statuses, students' needs for developing Inner Wisdom Development Programs with Buddhist Doctrines, and to survey of interpersonal behaviors of students.

The Training Inner Wisdom Development Program Instrument

The Training Inner Wisdom Development Program Instrument was

complied on the Program Package, Training Schedule, Training Content, Training Activity, Training Medias, Training Assessment, the Wisdom Test, the Interview Form, the Daily Short Note Form, and the Observational Student Form.

The Inner Wisdom Development Programs Students' Assessment Instrument

Making the Inner Wisdom Development Programs for Students' Assessment with Buddhist Doctrines, Wisdom Test, Training program assessment form, Interviews, Observations, Daily short note, and Students' satisfaction assessment form.

The Students' Satisfaction Questionnaire on Inner Wisdom Development Programs Instrument

Using the 5-Likert ranking of the Students' Satisfaction Questionnaire on Inner Wisdom Development Programs with Buddhist Doctrines instrument was assessed student perceptions of their satisfactions on the Inner Wisdom Development Programs with Buddhist Doctrines.

The finalized of instruments and the contents of the inner wisdom program

From the research study, using the research instruments for developing the Inner Wisdom program provides the community with a variety of methods, techniques and programs for the treatment of behavioral self-mindedness problems of bachelor educational student. The individual who is overwhelmed by depression, anxiety, addiction or distress that arises from struggling with a chronic psychiatric illness, whether the freshly students, will be interested in the services that Inner Wisdom program. The providing quality program in an outpatient setting by identifying the proper and most effective methods and services to use with each individual were

Table 1. Scale mean scores, standard deviations, and t-Test for the experience and controlling groups.

Group	Pre-test ($\overline{X}$)	Post-test ($\overline{X}$)	Mean difference	Standard deviation	df	t-test	ρ
Experimental	3.72	4.19	0.47	0.64	28	2.34*	0.03*
Control	1.75	1.82	0.07	0.20			

N = 263.

contents. Researchers do this within a holistic format, not limiting our methods of treatment to only a few. The basic philosophy from which researchers operate is that the body, mind and spirit are a unified whole, and cannot be treated independently one from the other.

Demographic information of participants of the developing inner wisdom program

Because the demographic information has many purposes, it is used for research in the social sciences, creation of policy, identification of potential customers in marketing. The following resources will be particularly useful for research in the social sciences, although they may have other applications as well. To report of this research findings on the demographic information of bachelor educational students and trainer teachers who were the participants of the Developing Inner Wisdom Program for improving self-mindedness with Buddhist Doctrines to Improvement in some demographic information takes the form of *data*, numbers of the research sample size and data results were interpreted. However, the demographic information takes the form of *statistics*, and following resources ought to help familiarize of this research administration with the research procedures used.

RESULTS

Recognizing the need for helping and seeking professional therapy is a sign of strength and determination to live a productive, self-mindedness, and meaningful of the bachelor educational students in Rajabhat Maha Sarakham University, Thailand who are the Buddhist and their daily life with the state religion of Buddhism. As a part of living their lives, researchers encounter situations that are difficult to manage alone. Some seek support due for a situational crisis. The staffs of Psychology program seek the treatment necessary to manage a brain disorder, commonly known as an inner wisdom program was developed. But whatever the reason, it is a well known fact that Buddhist Doctrines practicing helps.

Using the sample size of 93 trainer teachers to participate of the development of the Inner Wisdom Development Programs with Buddhist Doctrines for improving self-mindedness of the 263 bachelor educational students from 12 educational programs, such as; Mathematics, Computer, Chemistry, Biology, and etc., in the Faculty of Education, Rajabhat Maha Sarakham University. The comparisons between students' perceptions of mean scores of their developing self-mindedness

with the Buddhist Doctrines to their the Inner Wisdom Development Programs on two groups of the experimental and controlling groups with the research instrument that description of quantitative data of analyzing responses for students' perceptions assessments is reported in Table 1.

The results given in Table 1 shows that on average item means for each of the research instrument, that the minimum and maximum score possible on each of these scales is 0 and 5, respectively was analyzed. Because of this difference, the average mean was calculated so that there is a fair basis for comparison between different experience and controlling groups. These means were used as a basis for constructing the simplified plots of significant differences between forms of the research instrument. The *t-test* statistic which is the ratio of "between" to "total" sums of squares and represents the proportion of variance in scores accounted for different group by students' responses, which suggests that each of the research instrument was able to differentiate significantly (*p*<0.05), respectively.

In Table 2 the mean scores and standard deviation to assess students' perceptions of their inner wisdom development program with Buddhist Doctrines to improvement of their self-mindedness of the 263 bachelor educational students in 12 educational programs. For the remaining five scales, namely; *Activities, Time and Place, Student Understanding, Student's Application to Use, and Trainer Knowledge* scales*.

DISCUSSION

In this basic training the 508-freshly educational student group, with the aid of expert trainers individuals learn to discuss personal, practical, occupational and social problems in a supportive atmosphere with the 104-educationa lecturers who have similar problems and needs for developing the Inner Wisdom Program with Buddhist Doctrines. This group helps individuals develop the necessary insight to prevent future problems, relative the Buddhist Doctrines that within Buddhism, encourages everyone to become bodhisattvas and to take the bodhisattva vows. With these vows, one makes the promise to work for the complete enlightenment of all beings by practicing six perfections. According to the

Table 2. Scale mean scores, variance, and standard deviations for students' inner wisdom of their assessments.

Scale	Mean	Valiance	Standard Deviation	F-test
Activities	3.96	0.48	0.42	3.11*
Time and place	4.18	0.43	0.44	2.88*
Students' understanding	4.35	1.41	0.31	2.97*
Student's application to use	4.25	0.31	0.31	3.48*
Trainers' knowledge	4.21	0.67	0.46	2.21*

Buddhist Doctrines training plans, these perfections are: giving, discipline, forbearance, effort, meditation, and transcendent wisdom for student improvement on their inner wisdom. The investigations of lecturers' and students' problems and needs were described and defined as the continual repetitive cycle of birth and death that arises from ordinary beings' grasping and fixating on a self and experiences from expert trainers. Specifically, samsara refers to the process of cycling through one rebirth after another within the six realms of existence that this training program was confirmed on the Encyclopedia Britannica (2009).

Where each realm can be understood as physical realm or a psychological state characterized by a particular type of suffering. Samsara arises out of avidya (ignorance) and is characterized by dukka (suffering, anxiety, and dissatisfaction). In the Buddhist view, liberation from samsara is possible by following the Buddhist path accompany chronic pain, and builds confidence and self-problems and needs, thus leaving participants with a feeling of freedom and serenity. Students practiced with Devotion Training that is an important part of the practice of most Buddhists (Payne, 2006: 74). Devotional practices include bowing, offerings, pilgrimage, and chanting onto to the Lotus Sutra is the main practice. In the Inner Wisdom Program with Buddhist Doctrines, devotion to the Buddha Amitabha is the main practice for educational student group training is basic to the successful development of an individual's personal symptom management program. Trainees were to recognize stress and how it affects the body, mind and attitude is vital.

Finally, most of students' techniques for relaxation, such as deep muscle relaxation and guided imagery, are learned and practiced to perfection. Through practice, a sense of achievement is gained, and the ability to cope with stressful situations is mastered. The development of the Inner Wisdom Program with Buddhist Doctrines for educational students was provided, responsibility inner wisdom that is based on a realization of dependent origination to their Four Noble Truths and the Three Marks of existence to their Buddhist Doctrines Wisdom that is able to extinguish afflictions and bring about Bodhi of educational students that similar result to report from the study of Burnhill (2013).

Be more than curious about educational student dreams to a professional teacher in a school, students learn how to use the process of projective training, each participant in the participation of training students with the Inner Wisdom Program will have the opportunity to apply his or her own meaning to and planning to invent or build with the Buddhist Doctrines principle. Researcher spent time to share by others who are the Monks at the temples, Buddhist teachers who teach at the Buddhist school classes, searched the Buddhist documents and researches on Buddhist curriculum in the higher education, to deepen the learning, participants will be invited to share ideas by the use of journaling, guided meditation, and other for preparing development of the Inner Wisdom Program with Buddhist Doctrines assessment document to assess educational students who sat and registered on the course of the Psychological Program, the Faculty of Education, Rajabhat Maha Sarakham University in Thailand.

The integrative approach of mind creates an opportunity for increased wisdom and supports personal, community, and collective transformation. This program moves beyond traditional student behavior change. In this training assessment document, students were to be trained how to interpret the inner wisdom, why all inner wisdoms come in the service of health and wholeness by the Buddhist Doctrines principle to help background student's sense of life purposes, practice integration exercises, which enable the enhancing to become their thinking and experiencing self-vibrant previous gift versions, currently. The Inner Wisdom Program with the Buddhist Doctrines would be referred to moral theories that hold that the consequences of a particular action form the basis for any valid moral judgment about that action (or create a structure for judgment) for presenting a sustained argument that pleasure, correctly understood, will coincide with virtue, to be posited that the greatest good was contentment and serenity and peace of mind of students. The invention of this program comprised of the package program, purposes, contents, time schedule, training activities, innovation Medias, and training assessment were made.

Because Buddhism and psychology are both technologies of the mind, Buddhism excels in unbiased seeing, describing both ultimate reality and relative truth

with a clear-eyed profundity and a philosophical astuteness that's seldom been equaled. Like all great spiritual systems, it offers the possibility of breaking beyond the limitations of ego to a completely free and open experience of reality that's known as enlightenment (James, 2014). For this training educational students with the Inner Wisdom Development Program with the Buddhist Doctrines, students have practiced a form of depth psychotherapy that's been deeply influenced by students' Buddhist background. In their personal life as well as in their study, Students have found meditation practice and psychotherapy to be mutually supportive. Each takes them to places the other doesn't necessarily go; together, they open up new territory. The two traditions share a common bond in their focus on deepening and stabilizing awareness. Students have also found each to be a profound source of strength in dealing with suffering, an aspect of life that is explicitly acknowledged in both systems and almost as explicitly avoided by our present society.

Ethics of educational students, sometimes known as philosophical ethics, ethical theory, moral theory, and moral philosophy, that involves systematizing, defending and recommending concepts of right and wrong conduct, often addressing disputes of moral diversity to describes the character of a moral agent as a driving force for ethical behavior of students. Finally, researcher was emphasized this crisis and principle of Buddhism to develop the Inner Wisdom Program to assess educational students posited an ethical system that may be termed self-realizations and utilitarianism, that is an ethical theory that argues the proper course of action is one that maximizes a positive effect, such as "happiness", "welfare", or the ability to live according to personal preferences by the Inner Wisdom Program with Buddhist Doctrines of educational students. This program was composed with the Wisdom Test, Training program assessment form, Interviews, Observations, Daily short note, and Students' satisfaction assessment form, these indicate that have to improve and develop on educational students' behaviors, responsibilities, for the most effective transformative tool appropriate to a particular moment. Depending on circumstances, it may be placid or fierce, gentle or rough, whatever best fits the situation. Compassion is considered the quintessential their skills; together with wisdom, it constitutes the basis of student Buddhist practice. The bottom line is thus clear-eyed awareness and a fundamental sense of kindness and acceptance, applied to oneself and the world with equal generosity (Panich, 2008; Boonyarattanasoontorn, 2008; and Pamojjo, 2013).

The measurement of students' satisfaction can be useful to help students to pinpoint their strengths and identify areas for improvement. Satisfaction ratings go beyond teaching assessments, which have a narrow focus, to include broader aspects of the student learning experience. To grasp the complexity of that learning experience, fleshy educational students who were not enough to know the degree to which students are satisfied, using the satisfaction of students were assessed their satisfaction to their training on the Inner Wisdom Program with Buddhist Doctrines, it is important to understand the factors that contribute to student satisfaction. Student satisfaction is positively associated with this program completion rates and training achievements. Fleshy educational students who reported higher levels of satisfaction tended to have higher training program and were more likely to have completed their program than students who were less satisfied. These findings are similar regardless of gender, age, program, or location of the results of this study. Students reported that they were satisfied with their perceptions to their perspective on this research instrument.

As well, they are likely to say their studies prepared them for employment or further education. These items, combined into a single measure of satisfaction, align well with other measures of a successful Buddhist Doctrines experience and training practice with this package program and the questionnaire on student interaction, for example. Analysis of the ratings given to programs and other aspects of the meditation experience showed that satisfaction with Buddhist meditation refers to the meditative practices associated with the religion and philosophy of Buddhism, Buddhist meditation of students encompasses a variety of different meditation techniques, however, this training practices were trained program that aim to develop mindfulness, concentration, supramundane powers, tranquility, and insight. Given the large number and diversity of traditional Buddhist meditation practices, this article primarily identifies authoritative contextual frameworks both contemporary and canonical for the varieties of practices are the critical dimension of former students' overall satisfaction.

Providing students with a training practice program that achieves high approval ratings should promote high satisfaction ratings. Further, focusing on high quality instruction and creating opportunities for students to develop their analytical skills could also help development of the Inner Wisdom Program with Buddhist meditation to maintain high levels of student satisfaction. A good part of students' expression of satisfaction is related to factors other than the training practice program itself; there are demographic characteristics and outcomes that can influence satisfaction levels. Fleshy students, genders, sex, student's background and those from health-related programs tend to say they were more satisfied, having a training related practice shows the strongest effect. Although these factors are outside the direct control of the Inner Wisdom Program with Buddhist Doctrines questionnaire on satisfaction documents to students' perceptions, using them in the analysis contributes to an understanding of what makes students

satisfied.

As Buddhist philosophy is the elaboration and explanation of the delivered teachings of the Buddha as found in the Tripitaka and Agama. Its main concern is with explicating the dharmas constituting reality. A recurrent theme is the reification of concepts, and the subsequent return to the Buddhist Middle Way. Early Buddhism avoided speculative thought on metaphysics, phenomenology, ethics, and epistemology, but was based instead on empirical evidence gained by the sense organs (ayatana). The Buddha discouraged his followers from indulging in intellectual disputation for its own sake, which is fruitless, and distracting from true awakening. Nevertheless, the delivered sayings of the Buddha contain a philosophical component, in its teachings on the working of the mind, and its criticisms of the philosophies of his contemporaries.

One explanation for this silence is that such questions distract from activity that is practical to realizing enlightenment and bring about the danger of substituting the experience of liberation by conceptual understanding of the doctrine or by religious faith for non-Buddhist readers to understand on inner wisdom, Santina (2008: 31) emphasizes on awakening to another explanation is that both affirmative and negative positions regarding these questions are based on attachment to and misunderstanding of the aggregates and senses. That is, when one sees these things for what they are, the idea of forming positions on such metaphysical questions simply does not occur. Thanissaro (2004) recommended for the non Buddhist must be trained and practiced to have experience the entire path most elaborated in early Buddhism. The doctrine on the other hand was kept low. The Buddha avoided doctrinal formulations concerning the final reality as much as possible in order to prevent his followers from resting content with minor achievements on the path in which the absence of the final experience could be substituted by conceptual understanding of the doctrine or by religious faith, a situation which sometimes occurs, in both varieties, in the context of Hindu systems of doctrine.

The higher educational institute in Thailand, Buddhist: educational bachelor students in Mahasarakham Rajabhat University, vary on the exact nature of the path to liberation, the importance and canonicity of various teachings and scriptures, and especially their respective practices, Thanissaro (2004) said that one consistent belief held by all Buddhist in institutes was the lack of a creator deity, the foundations of Buddhist tradition and practice are the Three Jewels: the Buddha, the Dharma (the teachings), and the Sangha (the community). Taking on refuge in the triple gem has traditionally been a declaration and commitment to being on the Buddhist path, and in general distinguishes a Buddhist from a non-Buddhist Other practices may include following ethical precepts; support of the monastic community; renouncing conventional living and becoming a monastic; the development of mindfulness and practice of educational bachelor students to use the Buddhist Doctrines to improvement of their self-mindfulness similar like to their self-meditation; cultivation of higher wisdom and discernment; study of scriptures; devotional practices; ceremonies; and in the Mahayana tradition, invocation of buddhas and bodhisattvas.

Generally, the Buddha discouraged follower from indulging in intellectual disputation for its own sake, which is fruitless, and distracting from true awakening. Nevertheless, the delivered sayings of the Buddha contain a philosophical component, in its teachings on the working of the mind, and its criticisms of the philosophies of his contemporaries. According to the scriptures, during his lifetime the Buddha remained silent when asked several metaphysical questions, these regarded issues such as whether the universe is eternal or non-eternal (or whether it is finite or infinite), the unity or separation of the body and the self. For opening the chakra centres and third eye or wisdom eye it is the best to be strict vegetarian and to purify one´s energy. This is the safe way. There are many people who wish to open one´s chakras in swift way, unwise way, not being vegetarians and not purifying one´s energy enough. They can experience many problems and unbalances, together with mental problems. Psychic and chakra mastery is "byproduct" of spiritual path or spiritual evolution. The path toward Enlightenment begins with obtaining Refuge to the Three Jewels (Buddha-Dharma-Sangha), following with the Bodhisattva vow and related ethical precepts. It does not happen by chance – it must be individual strong decision to follow the Buddhist path to develop wellness and relate studies for students, teacher, and general people use by inner wisdom enlightenment and psychic mastery for developing and improving the spiritual body.

Conclusion

On the aspect of lecturers, the problems' needed to be developed on channels for students to consume Medias variously; there was none mindfulness and wisdom for selecting medias to consume and too dangerous on student. This result was to confirm that the highest average mean score (4.83), on the other hand, the developing programs' problems were indicated with the lowest average mean score (4.20) and the educational students were seldom applied the wisdom from the Buddhist doctrines in their daily life.

In terms of the effects of developing inner wisdom development with Buddhist Doctrines for educational students, this program was confirmed with the advice and perception of the senior professional educators. Students' wisdom skills were developed of their inner wisdom to their developing practice on gradual mindfulness and

concentration, to control with their distracted mind and being bad-tempered, to be changed calm on happy, too relaxed, to be relieved, and being physically exhausted on their being of their freshly and actively. Focusing on observation of training students with this program, students were able to develop of their practices, increasingly, to understand on training system, to improve self-behavior from bad characteristic to self-adaptation on minding situation, it's seemed that students were not tried, non hungry, peacefully and calmly, to be delighted and happiness with the observance of precepts and meditation during training program schedule.

Students' perceptions of their satisfactions on this program training were to understand, instructional uses, expert trainers, training activities, and time schedule and place of training. In term of students' interviews, students gained to the knowledge of the 4-Elements and the 5-Aggregates, They are the basic components of a being, students were understanding on the usual formula for an Aggregate is: "Past, present or future, one's own or external, gross or subtle, lofty or low, far or near." These are 11 different distinctions that go to make up an Aggregate. It will be seen that every conceivable kind or constituent is included. All this will be explained later when students are doing Vipassanā Meditation. Under-standing of the 5-khandhas or Aggregates plays a big part in Buddhism.

These 5-khandhas, viewed in another way, can be divided into Mind and Matter, or rather, Mentality and Materiality. Whenever Consciousness arises, there arise also the Feeling Aggregate and the Perception Aggregate and the Mental Formations Aggregate. These are the four Mental Aggregates. The Matter Aggregate is generated simultaneously by the four generators, viz., Karma, Consciousness, Temperature and Nutriment. This makes up the 5 Aggregates, that composed of decompose on oneself of transitory, everything is destroyed and changed, understandingly. Students were appreciated in Buddhist phenomenology and soteriology, to deep of skanhas or Aggregates, that constitutes the sentient being, understanding suffering: the five aggregates are the "ultimate referent" in the Buddha's elaboration on dukkha (suffering) in their First Noble Truth: "Since all four truths revolve around suffering, understanding the aggregates is essential for understanding the Four Noble Truths as a whole." Clinging causes future suffering: the five aggregates are the substrata for clinging and thus "contribute to the causal origination of future suffering".

Students understood changes that all things emerge, exist, and cease. They understood that everything has b e e n causes and factors that affect the relation that links them; on the aspect of feeling and mental growth, the students were happy and glad to have come. They felt warm, relieved, fresh, and active; on the aspect of application, the students understood that all things and lives are not stable and one should not cling to them.

Solving problems must be done with mindfulness. Thinking must be come before taking action. The students decreased distraction and more concentration on their work and read, to be able to control their feelings, to know what should they do on their thinking to values of things such as their eat extravagantly.

The satisfaction of students was measured with the Questionnaire Satisfaction Instrument on their participa-tions in training the Inner Wisdom Development Program with Buddhist Doctrines. Students' satisfaction was highest on knowledge and understanding (X= 4.75), instructional use (X= 4.61), expert trainer (X= 4.55), respectively, but this result indicated that satisfaction was very low for place, time and food (X= 4.18) .

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

High school students' time management skills in relation to research anxiety

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This study aimed to determine the opinions of high school students relating to time management and present a correlation of their time management skills with demographic variables, as well as examining the relation between their level of research anxiety and time management skills. The study group composed 270 12th-grade students (127 males and 143 females) from the same socio-economic level attending seven state high schools in Ardahan province, Turkey. Pearson coefficient of correlation, t-test, and weighted mean and standard deviation values were used. Results showed a meaningful relation in the negative correlation (r=-.188**, p<0.01) between time management skills and research anxiety level, and there was a meaningful relation between time attitudes, the second factor on the time management scale, and research anxiety in the negative direction (r=-.210**, p<0.01). We conclude that as students' time management skills improve, their research anxiety level decreases.

Key words: Time management, research anxiety, high school.

INTRODUCTION

In today's fast-paced world, the individual's possibility of using time efficiently is decreasing day by day. The tasks expected from people at work are increasing every year and institutions and organizations demand different things from their employees every day. Additionally, working life is becoming more complicated and the parameters affecting working life are increasingly changing. All these changes can be tolerated up to a point; however, that the rate of change is rising in itself reveals the insufficiency of time at a certain level (Uluşahin, 1999). Given that every individual has the same amount of time at their disposal, in fact, many complain they do not have enough time. Yet some manage to do more work compared to others in the same amount of time. To understand how this is possible is an

important issue (Keenan, 1996).

The criterion of success is not to be successful as such but to reach one's target in the fastest way (Yeşilyaprak, 2003). People who know how to use their time in the correct place and at appropriate times know their priorities and make plans to realize them accordingly. As for planning, this makes two contributions in arranging an individual's life. The first shows how to reach the desired point from where you are. The second defines how to reach the desired point in the shortest time (Efil, 1999). Sabuncuoğlu and Tüz state that the time you feel is different from the time that clocks show (cited in: Varışoğlu et al., 2012). Although the time shown on the clock is linear and sequential, each second is not more valuable than the other. However, the time we feel and

are experiencing is quality time. In the time referred to here it is not important how long it lasts; it is more important how much merit we obtain (Sabuncuoğlu et al., 2010 p 6).

Although time is extremely important, at the same time it is the most difficult to define and most abstract thing in our lives, something everybody feels but cannot touch and is not reversible (Passig, 2005). According to another definition, contrary to sources such as money, material, machinery and talent, time is a non-renewable, irreplaceable and irremediable source. It continuously proceeds and disappears (Eilon, 1993 p 255). Passig (2002) stresses two dimensions of the concept of "time", namely, physical and psychological. While physical time is referenced via clocks and watches, although it is related to the consciousness, both dimensions are made up of time units called psychological moments. According to Smith (1998), time is a relative concept, though it exhibits multidimensionality with its physical, philosophical, psychological and sociological features. It is as a result of this relativity that the same duration of time is perceived as shorter or longer by different individuals. Time is defined as a continuous process in which events come from the past and follow each other into the future. Çelik (2002) explains time as the necessary duration to carry out certain jobs or work.

As to the management of time, Erdem (1999) defines it as the implementation process of management functions such as planning, organizing and controlling one's own activities in order to reach targets in an individual's private and working life in the most efficient and effective way. Sayan (2005) defines time management as an opportunity to provide more time for better planning of a career, preparing for the future, reading more and learning more, following developments and improvements in technology, sparing more time for family members and acquaintances, entertaining, thinking, creating new ideas and starting new projects. To Uğur (2000 p 18), time management is the effort of using time efficiently as an essential resource to reach aims and targets. Efil (2000) define it as an individual's power to determine a particular target among various priorities, most of which are vital, and achieving the target(s) determined, and also the skill of using a certain time period most efficiently to achieve a goal. Özgen (2000) defines it as planning time that enables us to carry out goals, targets and activities within our social life. Alay and Koçak (2003) state that comprehending and implementing time management does not solve the problem for individuals in itself, but it does help individuals reach effective solutions and consequences.

Uğur (2000) defines using time efficiently and effectively as;

1. Having clear targets and aims
2. Planning

3. Determining priorities
4. Assessing urgency

Çağlayan and Göral (2009) indicate that the concept of time is perceptive and it is essential that time be used correctly and effectively from childhood. From adolescence onwards, a sense of time management should be developed. According to Passig (2002), although time management starts to develop from early childhood, it is completed in adolescence. Passig (2005) reports two main approaches in the period from infancy to adolescence related to the development of time management. The first is the psycho-analytic approach and the second is the cognitive approach. In the psycho-analytic approach, according to Freud, perception is a part of ego development and being able to postpone pleasure by the child. On the other hand, it is made up of single moments in infancy and therefore events are not related to each other and can be forgotten very soon. As the child grows up, the memory develops parallel to this growth and enables the child to connect events with each other. The child starts to understand that events happen sequentially and in this way, a time matrix develops in the child. The time matrix is also a connection between the child and mother.

In the cognitive approach, Piaget states that the child lives in a world where there is no concept of time and that the time concept is realized gradually. In the first years of childhood, although the ability to remember, which is a pre-condition in development of the concept of past, future and present cannot be attained, it is assumed that time is experienced as the sum of all events in early childhood. Therefore, the small child lives in a world composed only of moments. However, the child understands deeply the difference between past, future and present after the age of five. Child comprehension of time in all its dimensions occurs between the ages of 14 and 18, which we refer to as adolescence. The development of using time effectively in childhood and adolescence is a matter that needs to be improved. Adolescents especially have to achieve complicated tasks such as social development, identity development, preparing for their future profession, and planning the future and academic success (Seginer and Lilach, 2004). During all these complicated developmental tasks, it is important for adolescents to be successful in comprehending the importance of time, realizing habits related to usage of time, and changing incorrect behaviors if they have developed them, because in an environment where consciousness of time cannot be achieved, an individual's control over life also disappears, and development depends on coincidence and luck.

Therefore, people are required to group their tasks and to group them in accordance with priorities. Time management is actually self-management; that is, as well as providing control over events we experience, an

individual directs events by manipulating them. The success of an individual in time management can be determined through their answers to two questions; "How many events happen as we wish them to be?", and, "What is our role in the development of these events?" (Güçlü, 2001).

There is a bi-directional relationship between the terms "time management" and "anxiety". The individual who has not developed a consciousness of time will experience negative consequences such as a high level of anxiety, lack of confidence, stress, and bad habits in terms of time usage (Özkılıç, 2003). Anxiety is usually a state of nervousness mixed with sense of insecurity and a state of anticipating the future which upsets and worries the person (Öncül, 2000). Another definition of anxiety refers to it as inner and external conflicts, encountering an unaccustomed situation, object or person, or encountering a situation or object which causes fear and obsessive thoughts (Köknel, 1982). In addition to all these definitions, environmental factors such as the rapid development of technology, scientific discoveries, increasing population, and economic hardships which intensify stress, also increase anxiety. It is assumed that everything threatening the existence of an organism's well-being constitutes anxiety. Threats of physical harm, threats to the ego, and situations demanding more than the individual's capacity all cause anxiety (Atkinson and Hilgard, 1995). The teaching of research aims to develop research awareness in society and the individual by means of adopting scientific attitudes and behaviors and the giving the student the proficiency to carry it out (Ünal and Ada, 2007 p 140). As for research anxiety, this may occur along with other behaviors, such as not doing research unless it is necessary, unwillingness to carry out research, feeling uncomfortable with the idea of doing research, feeling nervous while conducting research, and lack of confidence in doing research (Çokluk et al., 2005).

The concept of time, already influential in every part of life, has also begun to affect education deeply (Özçelik, 2006). When the importance of schooling in an individual's development is considered, time is seen one of the basic elements of productivity, similar to money, human labor and technology (Karslı, 2006). Due to the relationship between time and anxiety as active elements in the learning process, student awareness of the relation between the concept of time management and research anxiety should be raised and they should be made conscious of this. In the literature, studies on teachers and teacher candidates have mainly been carried out in terms of determining the relation between anxiety and time management (Gözel and Halat, 2010; Varışoğlu et al., 2012; Akın et al., 2013; Güleç et al., 2013). Regarding studies on the relation between time management and anxiety, we see that Eldeklioğlu (2008) analyzed the relation between high school students' time management skills and state-continuous anxiety. Misra and McKean (2000), in their study of university students, analyzed the relation between time management, anxiety and leisure time. Most of the studies to determine the relation between time management and anxiety analyzed the time management skills of teachers and teacher candidates. Research studies on high school students' time management skills were few. It was observed that studies at high school level are predominantly related to exam anxiety, stress and state-continuous anxiety level. Given that there were no previous studies on determining the relation between time management skills and research anxiety among high school students, this topic was deemed worthy of study. The term "Research Anxiety" in this study is understood to mean "research" requested by high school teachers when they give the students homework or scientific-orientated assignments requiring the finding of external sources of information. The "anxiety" arises from the process of conducting this research.

The objectives of this study were to determine the time management skills of high school students, to evaluate the relation of students' time management skills with demographic variables, to present the students' time management skills in relation to their opinions about time management, and to determine the relation between their time management skills and research anxiety. For this purpose, answers to the following questions were sought:

1. In general, what level are the students' time management skills?
2. Is there a statistically meaningful correlation between students' time management skills and demographic variables, including "Gender", "Accommodation environment" and "Working part-time"?
3. Is there a statistically meaningful correlation between the students' time management skills and their answers to the questions below;
i. Do your parents allow you to manage your time by yourself?
ii. Do your teachers inform you about time management?
iii. Do you think you allocate enough time for the preparation of exams?
iv. Do you think you have used your time correctly up to now?

4. Is there a statistically meaningful correlation between students' time management skills and research anxiety?

METHODOLOGY

In the study, 270 students studying in the 12th grade (male 127 and female 143) of seven state high schools run by the Ardahan Provincial Directorate for National Education, Turkey were investigated to determine the relation between their time management skills and research anxiety. For this purpose, the study was planned and conducted as a descriptive study using the

research scanning method. Before data collection, the necessary legal permission to carry out this case study was obtained from Ardahan Provincial Directorate for National Education. Students were informed about the aims and scope of the study and they participated voluntarily. Students were also told that the main outcomes of the study would be submitted for scientific publication.

Data collection tools

Three different scales were used in this study. Firstly, the "Time Management Scale", adapted into Turkish by Alay and Koçak (2002); secondly, the "Research Anxiety Scale", developed by Büyüköztürk (1997), and finally, a questionnaire consisting of 5 closed-ended questions developed by the researcher in order to determine the opinions of students about time management, along with their demographic information.

Time management inventory (TMI)

In collecting the data, the Time Management Inventory (TMI), translated into Turkish and analyzed for its validity and reliability by Alay and Koçak (2002), was used. For the scale, Principal Components Factor Analysis was carried out. 3 sub-headings and 27 questions were decided upon as the number of items. The inventory comprised the topics "Time planning", "Time attitudes" and "Time Consumers" and was prepared using the Likert Scale. Answers consisted of "always", "often", "sometimes", "rarely" and "never". The choices were given grades between 1 and 5. The "Time planning" sub-scale refers to long-term and short-term (daily or weekly) planning and one question was a contrary statement (item 16). There were 16 questions. Students who achieved high points in this section were those who used their time efficiently and had the right to use their own time. The "Time attitudes" sub-scale consisted of 7 questions, 4 being straight and 3 being contrary, which were aimed at what the individual does in terms of time management. The students who scored high points in this sub-scale were considered to manage their time well and to be thinking in long-term intervals. The other sub-scale was composed of 4 questions related to activities students spent their time doing negatively; in all these questions contrary expressions were used. Therefore, these items are called "time consumers". Time consumers are considered to consist of everything which keeps students from achieving their school goals.

In the validity and reliability study developed by Alay and Koçak (2002), reliability was 0.87 for all scales. In the sub-scales, Cronbach alpha values were 0.88 for "time planning", 0.66 for "time attitudes" and 0.47 for "time consumers". With the scale used in this study, different reliability coefficients were obtained for the 3 factors making up the scale and for the whole scale. This scale was also used in other studies with different sample groups. For example, in a study by Demirtaş et al. (2005), the reliability coefficients of the scale were found to be: for the time planning dimension 0.84, for time attitudes 0.59, for time consumers 0.45, and for the scale in general 0.80. In a study analyzing the level of time management in teacher candidates, Gözel and Halat (2010) calculated the scale's reliability coefficient as; 0.83 for the time planning dimension, 0.59 for time attitudes, 0.43 for time consumers, and 0.81 for the scale in general. When the reliability value of the factors of time management scale used in the present study was analyzed, they were found to be 0.82 for time planning, 0.58 for time attitudes, 0.46 for time consumers and 0.70 for the scale in general. The third factor, the time consumer factor's reliability coefficient, was observed to be lower in this study and in previous studies. The possible cause for this according to Gözel and Halat (2010) is that it

resulted from the answers of smoking students to the 26th item (Do you smoke a packet of cigarettes a day?). Since they answered negatively, it was assumed to be a time consumer. Erdul (2005) stated that researchers consider these alpha levels resulted from the few questions gathered in this sub-scale. The interval for the degree of student involvement in the scale items was calculated with the formula (n-1/n). The calculation was found to be 0.80 with 1-5 intervals. The limits for the positive items participating level in our scale were determined as; 1.00-1.80 (none), 1.81-2.61 (rarely), 2.62-3.42 (sometimes), 3.43-4.23 (often) and 4.24-5.00 (always).

Research Anxiety Scale (RAS)

To collect data in order to determine students' research anxiety, the "Research Anxiety Scale" developed by Büyüköztürk (1997) was used, consisting of 87 reliability coefficient and quinary Likert type questions. The answers given to the items in the scale were coded numerically from 5 to 1. Expressions reflecting the anxiety state (n=7) were from "completely agree" to totally disagree". The expressions directly reflecting the state of anxiety (n=5) and contrary expressions were coded vice versa (i.e. 1-5). Thus, the highest point achievable in the scale reflected a high level of anxiety, while low points refer to a low anxiety level. The lowest point that could be obtained on the scale was 12 and the highest was 60.

Data analysis

For students participating in the study group, the "Time Management Inventory", "Research Anxiety Scale" and "Information Questionnaire" were applied at the same time. The data obtained from the scales were analyzed using SPSS 16.0 software program. Pearson Correlation Method was used to determine the relation between time management and research anxiety level; to determine whether students' demographic variables of "gender", "accommo-dation environment" and "working part time" made a difference in terms of their time management skill. t-test was applied in order to analyze the relation between time management skills and student thoughts on time management (p<0.05), thereby interpreting their level of relevance. In addition to this, the weighted mean and standard deviation value of their answers to the items in the time management scale were calculated.

RESULTS

The findings obtained at the end of the analysis are shown in Tables 1 to 5.

According to the correlation analysis in Table 1, a meaningful relation low level in a negative direction was found between total time management and total research anxiety level (r=.188**, p<0.01), and between time attitudes, which are sub-factors of time management (r=.210**, p<0.01). According to this finding, as the level of students' time management skills rises, their research anxiety decreases, i.e. they are inversely correlated.

Regarding Table 2, a statistically meaningful difference could not be found as to the students' gender, accommo-dation environment, working part time, parents allowing them to use their own initiative for time management, their opinions on their teachers' informing them about

Table 1. Correlation between time management inventory (TMI) and scores on research anxiety scale (RAS).

Correlation value between point average of time management inventory and research anxiety point average		Research anxiety scale total research anxiety
Time Management Inventory	Total time management	-.188**
	Time planning	-.099
	Time attitudes	-.210**
	Time consumers	-.107

**p<0.01.

Table 2. Relation between student's time management skills and demographic variables.

Variables		N	WM	Ss	t	df	p
Gender	Female	143	3.064	.479	1.679	268	.094
	Male	127	2.977	.356			
Accommodation environment	Home	154	3.039	.402	.716	268	.474
	Dorm	116	3.002	.459			
Do you have a part time job?	Yes	30	3.049	.421	.348	268	.728
	No	240	3.020	.429			
Do your parents allow you to manage your own time?	Yes	218	3.038	.440	1.195	268	.233
	No	52	2.960	.367			
Do your teachers inform you about time management?	Yes	213	3.042	.418	1.366	268	.173
	No	57	2.955	.455			
Do you think you spared enough preparation time for exams?	Yes	86	3.044	.446	.541	268	.589
	No	184	3.014	.419			
Do you think you have used time correctly up to now?	Yes	73	3.109	.456	2.008	268	.046*
	No	197	2.992	.412			

*p<0.01.

time management, and their opinions about whether they spared enough time to prepare for exams and their time management skills (p>0.05). However, it was found that there was a statistically meaningful difference between the variables of whether students had used their time effectively up to that point and their time management skills. This difference resulted from students who thought they had not spent their time correctly (p<0.05). Statistical data regarding the "Time Planning" subscale of time management are given in Table 3.

As a result of measuring students' time management skills, it was determined that in the first factor of the scale, the students' highest average was the two items "Do you determine your priorities and follow them?" (=3.46) and "Do you carry things with you which you can study in case you have free time to work on them?" (=3.29). The lowest average was the two items "Do you

make a list of things you have to do each day?" (=2.33) and "Do you spend time planning every day?" (=2.47). When general average of students answers (=2.88) to explanations in planning factors are considered, in addition to their medieval -level attitude in planning the time, majority of students have ability of their priorities. On the other hand, even though we confirmed that they keep work items in order to complete their on-going researches, most of students cannot execute their studies in a planned way. Statistical data regarding the "Time Attitude" subscale of time management are given in Table 4.

It was seen that in the second factor of the time management scale, "Time Attitudes" (Table 4), the two items on which students achieved the highest average was "Can you make minor decisions promptly?" (=3.78) and "Do you in general feel that you yourself plan your

Table 3. Replies to time planning subscale of time management inventory (TMI).

Time management inventory		
Time planning (short and long term planning)	**WM**	**Ss**
1. Do you plan your day before you start?	2.89	1.352
2. Do you determine a series of targets for each week at the beginning of the week?	2.67	1.179
3. Do you spend time planning every day?	2.47	1.187
4. Do you decide upon some targets for yourself every day?	3.19	1.084
5. Do you make a list of things you have to do each day?	2.33	1.185
6. Do you program the activities that you have to do on school days?	2.98	1.396
7. Is it clear what you want to accomplish in the following week?	2.74	1.176
8. Do you fix a date to complete your studies?	2.91	1.272
9. Do you try to program the best time for tasks requiring a lot of effort?	3.12	1.154
10. Do you mark important dates for you on a calendar (date of exams, assignment submission dates, etc.)?	3.04	1.498
11. Do you determine a series of targets for the school term?	2.94	1.224
12. Do you duplicate and file articles and scientific studies in case you need them later, even if they are not needed now?	2.49	1.365
13. Do you revise your lesson notes, even if you do not have an exam soon?	2.84	1.178
14. Do you carry things with you which you can study in case you have free time to work on them?	3.29	1.270
15. Do you determine your priorities and follow them?	3.46	1.139
16. Do you carry out matters concerning yourself every week without planning or pursuing them beforehand?	2.84	1.226
Mean	2.88	.650

WM: weighted mean; Ss: standard deviation.

Table 4. Responses to time attitudes subscale of Time Management Inventory (TMI).

Time attitudes	**WM**	**Ss**
1. Do you use your time constructively?	3.21	1.091
*2. Do you need to improve yourself in planning your time?	2.48	1.275
3. Do you in general feel that you yourself plan your time?	3.33	1.166
4. Do you usually think that you will be able to achieve your all goals in the time given to you?	3.20	1.233
5. Can you make minor decisions promptly?	3.78	1.141
*6. Do you often find yourself busy with tasks that prevent you from doing your school work only because you cannot say "No" to people?	2.78	1.340
*7. Do you find yourself waiting if you do not have anything to do?	2.91	1.249
Mean	3.09	.539

*Items graded negatively. WM: weighted mean; Ss: standard deviation.

time?" ($\overline{X}$ =3.33). The two items with the lowest average was "Do you need to improve yourself in time planning?" ($\overline{X}$ =2.48) and "Do you often find yourself busy with tasks that prevent you from doing your school work only because you cannot say "No" to people?" ($\overline{X}$ =2.78). Considering general average of students answers ($\overline{X}$ =3.09) to explanations in time attitudes, in addition to their medieval-level attitude in this respect, we determined that students make a quick reaction in case of trivial decisions and, even though students state that they plan their time, most of them indicate that they need to be improved in respect of time planning They also stated to consider their priorities in school works. Statistical data regarding the "Time Consumer" subscale of time management are given in Table 5.

As to the third factor on the time management scale, "Time Consumers" (Table 5), the item with the highest average was "Do you smoke one packet of cigarettes a day on average?" ($\overline{X}$ =4.17). The item with the lowest average was "Do you usually continue working on a very important school assignment the night just before the due date?" ($\overline{X}$ =2.81). Regarding general average of student answers ($\overline{X}$ =3.02) to explanations in time consumers factor, we determined a medieval-level attitude.

Table 5. Replies to time consumers subscale of Time Management Inventory (TMI).

Time consumers	WM	Ss
*1. On a typical school day, do you spend more time on private issues than on school tasks?	3.24	1.206
*2. Do you spend time on habits or activities from which you do not benefit at all?	3.51	1.329
*3. Do you smoke one packet of cigarettes a day on average?	4.17	1.372
*4. Do you usually work on a very important school assignment the night just before the due date?	2.81	1.411
Mean	3.43	.805
General average	3.02	.427

*Items graded negatively. WM: weighted mean; Ss: standard deviation.

DISCUSSION AND CONCLUSION

This study examined the relation between 12th grade students' time management skills and their research anxiety level; also the relation between students' demographic variables (gender, accommodation environment, working part time) with their time management perception and between students' thoughts about time management and their time management perception. According to the findings of the study, there is a meaningful relation between time management and research anxiety in a negative direction. In addition, a meaningful relation in a negative direction was found between time attitudes, which is a sub-scale of the time management scale, and research anxiety. According to these findings, as students' time management skills rise, their level of research anxiety decreases. In other words, as their anxiety level increases, their ability to control time fades and becomes more difficult.

The findings of this study show similarities to some previous studies. Eldeklioğlu (2008) found a meaningful correlation in a negative direction between time management and anxiety. Erdul (2005) determined a meaningful relation in a negative direction between anxiety level and time management skills in a study carried out with university students. Macan et al. (1990) also found a meaningful correlation in negative direction between stress level and time management skills in their study of university students. Another similar result was provided by Kaya et al. (2012), suggesting, based on a negative correlation, that the level of continuous anxiety of students decreases in line with an increase in their time management abilities. Misra and McKean's (2000) study also previously agreed well with the aforementioned finding, verifying a negative correlation between time management attitudes and the academic stress levels of high school students.

In consequence of studying students' time management perception according to the variable of gender, a meaningful difference could not be found between groups, as confirmed by Ozsoy (2014), suggesting the absence of a significant relationship between the variables of gender and time management skills in physical education teachers. It is also concluded in Ozsoy (2014) that the score of students who were living with their family was higher than those of students staying in a dormitory. Lastly, the time management score of students working in a part-time job was higher than that of non-working students. However, this situation did not create a statistically meaningful difference between their time management ratings.

In addition, when the correlation between students' opinions about time management and their time management total score is considered, it was seen that there was a statistically meaningful difference between the answers to the question "Do you think you used time correctly so far?", and that this difference resulted from those who thought they used their time correctly up to then. From this point of view, it can be said that someone who regrets they did not use time properly is likely to lack the time management skill.

When the average scores of students' answers to the scale items were analyzed, it was determined that a majority of them determined their own priorities and pursued them; that they could make minor decisions promptly and planned their time by themselves although most of them did not carry out their daily tasks in a planned manner; they smoked a packet of cigarettes a day; and they expressed the need to improve themselves in time planning. This matches data reported by Wahat et al. (2012), indicating that university students possess the ability to plan their time in their short, medium and long-term studies. In addition, Misra and Mckean (2000) revealed that the academic stress and anxiety of students decreases in line with the use of efficient time management techniques.

From these findings, it may be concluded that although students planned their time in line with their priorities, they needed professional help as to how they should use their time more actively. Need for such academic support has recently been remarked upon by Liu (2009), working with middle-school students, who draws attention to the benefit of remediation programs in regard to time management and suggests that the development of time

management assessment can benefit students at risk.

When the research findings are assessed in general, we can say that the issue of time management should be emphasized more in schools; that it is necessary the concept should be explained to students at every stage of education, not only at high schools. To achieve this, there should be programs prepared to lessen research anxiety and increase the time management skills of the students via high school counseling services, as stressed by Kaya et al. (2012). This is also confirmed by Eldeliklioğlu (2010), revealing with prospective teachers that those students having time management skills are psychologically healthy individuals. Similarly, regarding preservice teachers, Güleç (2013) found that activities which teach time management techniques and decrease anxiety should be included in every stage of education, starting from pre-school.

On the basis of this study, if we are to make some concrete suggestions, it is essential that activities for teaching time management techniques and lessening research anxiety should occupy a more important place in educational institutions, especially as part of developmental and preventive counseling in high school counseling services. Once it is discovered that students regret their wasteful time usage and need professional support to be able to use time more productively, it is necessary to perform catch-up-work and activities for the students so that they can use their time more actively and be more planned henceforth. As such, Lafçı and Öztunç (2009) signaled that students complained about time limitations and thus could not use their time efficiently in school, leading to an increase in their anxiety. Reducing stress in students can also be achieved through appropriate methods such as effective time management, social support and positive reappraisal (Blake and Vandiver, 1988; Mattlin et al., 1990). Associated with the use of these methods, Nadinloyi (2013) also emphasized that a student's time management skills can be enhanced in this way, and suggested, based on an experimental study, that university students showed a significant positive difference in terms of time management skills in favor of the experimental group.

SUGGESTIONS

On the basis of this study, if we are to give some concrete suggestions, it is essential that activities for teaching time management techniques and lessening research anxiety should take more place in every stage of education institutions, especially as part of developmental and preventive counselling studies of high schools' counselling services; once it is discovered that students have regret about time usage and they need professional support to be able to use time actively, it is necessary to carry out catch-up-work and activities for

the students so that they can use their time more actively and be more planned henceforth.

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

Perspectives of prospective elementary school teachers on feedback in the Mathematics Instruction I and II courses

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The purpose of this study was to examine prospective elementary teachers' views on the feedback provided by the instructor and their peers during the courses, Mathematics Instruction I and II, and its contribution to their learning. Forty participants were regularly given feedback by the instructor and their peers while they were taking Mathematics Instruction I and II in the 2013-2014 academic year. At the end of the academic year, a survey form was administered to them. The form contained open-ended questions designed for this study. The form contained open-ended questions designed for this study. The data, which were analyzed qualitatively, showed that prospective elementary teachers consider the feedback provided by the instructor as mostly descriptive, whereas the peer feedback as mostly evaluative. In addition, the former made a more positive contribution to the participants' performance, since it offered more guidance.

Key words: Feedback, characteristics of effective feedback, instructor feedback, peer feedback.

INTRODUCTION

Beginning in the 2005-2006 academic year, Turkey's national elementary school curriculum was gradually amended, and it was revised again in 2009. Accordingly, its instructional theories, methods and techniques were changed. This, in turn, led to radical changes in measurement and evaluation methods, techniques and approaches. For example, the 1998 elementary school mathematics curriculum used conventional measurement and evaluation methods, while the new one calls for portfolios, performance assessment, projects, self-assessment and peer assessment (Ministry of National Education, 2009). In other words, the new elementary school mathematics curriculum recommends a formative approach to assessment (Baki, 2008).

Most research in the literature focuses on the relationship between measurement and evaluation and learning and recommends using formative assessment to contribute to student learning (Glover and Thomas, 1999; Higgins et al., 2002; Li and Steckelberg, 2004; Peterson and Irving 2007). Teachers who use a formative approach to feedback provide their students with constructive and detailed information about their misconceptions, thereby allowing them to correct their mistakes and deficiencies (Baki, 2008; Reys et al., 1998; Lipnevich and Smith,

2009). Research suggests that this type of feedback has positive effects on students' development (Sadler 1989; Skelton, 2002; Li and Steckelberg, 2004; Tunstall and Gipps, 1996; Taras, 2005; Lipnevich and Smith, 2009).

Feedback plays a pivotal role in improving students' performance, since it informs students about their performance and contributes to their abilities (Sadler, 1989; Higgins, 2000; Taras, 2005). Effective feedback not only boosts students' learning, but also leads to improved self-confidence and self-esteem (Black and Wiliam, 1998b; Chickering and Gamson, 1987; McKeachie, 1998). In his meta-analysis of 87 studies, Hattie (1987) found feedback to be the strongest factor in student accomplishment. Black and William (1998a) emphasized that feedback has more profound, consistent and positive influences on learning when compared to other instructional components. According to Walberg (1984), feedback is ranked third among 26 factors in student accomplishment. Similarly, Adrienne (1997) reported that feedback can increase student accomplishment from 50% to 89%. Prospective teachers (students enrolled in faculty of education) are learners that imitate practices of their teachers. Therefore, whether teachers can play key roles in facilitating student learning (Nicaise et al., 2007) depends on the extent to which they can properly use feedback, which is one of the main components of learning and assessment (Black and Wiliam, 1998b; Sadler, 1998; Torrance and Pryor, 1998). Only in this way can they support and reinforce student learning (Torrance and Pryor, 1998; Hattie and Timperley, 2007) and generate significant learning attainments.

It is reported in the literature that the principal characteristics of effective feedback concern timing and form as well as the person who provides it (Butler and Winne 1995; Kluger and deNisi 1996; Hattie and Timperley 2007). Studies indicate that providing feedback at the end of the student's performance is more effective, whereas feedback that interrupts what the student is doing has a negative influence on student learning (Brookhard, 2008). Research on the appropriate form of feedback decisively demonstrates that formative feedback is effective (Tunstall and Gipps, 1996) and evaluative feedback is not only ineffective, but also potentially even worse than not giving any feedback at all (Butler 1987; Butler, 1988; Kluger and DeNisi 1996; Davies, 2003; Gipps, 1999). Research also suggests that students would like to get formative feedback at the end of their performance (Straub, 1997; Bardine, 1999). There is little research on feedback in the Turkish literature (Bayraktar 1985; Köğce et al., 2008; Köğce et al., 2009; Çimer and Yiğit, 2010; Türkdoğan, 2011, Çabakçor et al., 2011; Köğce, 2012). Kogce et al. (2008) focused on the views of prospective mathematics teachers on feedback as a concept, whereas Cabakcor et al. (2011) attempted to identify what forms of feedback prospective mathematics teachers would like to get during mathematics classes and what forms of feedback

they actually get. Others have tried to determine the types of feedback that teachers use.

It is reported in the literature that most students read and pay attention to comments and feedback provided by their teachers (Ding, 1998; Bardine, 1999; Hyland, 2000; Higgins, 2000; Higgins et al., 2002; Doan, 2013). Therefore, improving student performance depends heavily on teachers' ability to provide effective feedback. In addition to teacher feedback, peer feedback should also be considered a key component of the educational process. Based on the principles of active learning and adult education, peer feedback is an alternative form of assessment in which students evaluate essays or presentations prepared by their peers. It encourages them to be engaged in reflection, discussion and cooperation. It involves exchanges of feedback among students, which enables them to learn from one another (Falchikov and Goldfinch, 2000; Wen et al., 2006; Vickerman, 2009; Strijbos and Sluijsmans, 2010; Li et al., 2010). In other words, the most significant educational function of peer assessment is that it offers detailed peer feedback (Falchikov, 1995). Thus, it not only enhances student responsibility and autonomy, but also provides students with a collaborative environment to work in (Earl, 1986; Falchikov and Goldfinch, 2000).

Pre-service training is a key factor in training teachers, a fundamental group in education, in accordance with modern necessities (Kaya and Samancı, 2013; Baştürk, 2015). This is because one of the most significant stages of teacher training programs is preparing prospective teachers for real educational environments (Sarıtaş, 2007). Depending on the quality of their pre-service training, some teachers may be encouraged to prepare a stimulus-rich environment to accelerate child development, while others may prepare inappropriate environments and thus restrict or inhibit child development (Baştürk, 2015). Therefore, teacher training programs are an indispensable part of the overall educational system and are constantly investigated and supervised (Akalın, 2014). Attempts are made to enhance the quality of teachers and prospective teachers through in-service and pre-service training, respectively, and teacher trainers are expected to encourage teachers to use effective instructional methods. Unless teacher trainers and mentors can give effective feedback on how prospective teachers should acquire knowledge about and competence in their fields, it is inevitable that they will misuse otherwise effective methods, techniques and materials (Gersten et al., 1997). Hence, prospective teachers should be taught about effective methods and techniques and given regular feedback (Scheeler, Ruhl and McAfee, 2004). This study is motivated by the fact that most research on feedback in the literature focuses on elementary school students and that there is little research on prospective teachers' perceptions of feedback (Köğce et al., 2008; Çabakçor et al., 2011). Moreover, there are some studies in the literature on the

characteristics and effectiveness of feedback provided by instructors and peers from students' viewpoint (Buhagiar, 2013; Lilly et al., 2010). However, these studies do not focus on students' views about comparing peers and teachers' feedback. For this study, prospective elementary teachers taking Mathematics Instruction I and II were asked to prepare and implement a lesson plan appropriate for the mathematics curriculum. In addition, they were asked to design and present a project about the relationship between mathematics and daily life. The detailed procedures for the entire study are explained in the next section. The objective was to urge the prospective teachers to share their knowledge with the instructor (lecturer that give Mathematics Instruction I and II courses) and their peers and to improve their assignments based on feedback. The participants were given feedback on their assignments by the instructor and their peers during two semesters (entire academic year). The instructor attended to the prospective teachers within and beyond the class hours both individually and as a group, providing feedback on how to improve their assignments. The procedures were followed by the study on the participants' views on the characteristics and effectiveness of the feedback provided by the instructor and their peers.

The significance of this study is highlighted by the fact its results can help instructors to plan and teach better. The following research questions were posed accordingly:

1. What are the views of the prospective teachers on feedback and its desired characteristics?
2. What are their views on the characteristics of the feedback provided by the instructor and their peers?
3. What are their views on the contributions of the instructor and peer feedback to their performance?
4. What are their preferences for receiving feedback?

The procedures in the Mathematics instruction courses

Great care was taken to make sure that the prospective teachers were actively involved in the process so that they could acquire the qualities specified in the elementary school mathematics curriculum. At the beginning of the first lesson, they were informed in detail about how the courses would be taught and the roles they and the instructor were expected to play. Both Mathematics Instruction I and II were conducted in two stages, theoretical and practical.

The theoretical part of Mathematics Instruction I was composed of classes that lasted for eight weeks, during which the instructor lectured on and gave examples of the nature of mathematics, learning approaches, instructional methods and techniques, the mathematics curriculum (objective, philosophy, vision, learning domains and attainments, pedagogy and so forth) and measurement and evaluation in mathematics instruction

(conventional and alternative methods). In the practical part, the prospective teachers were asked to form groups of five members with whom they can work in harmony and cooperation according to previous research suggestions (Webb, 1991; Leonard, 2001; Gillies, 2002; Johnson and Johnson, 1990). Then, each group was given five or six complete learning attainments from the elementary school mathematics curriculum.

Initially, the group members were not individually assigned learning attainments so that they could work effectively as a group and contribute to each other's learning. The instructor informed the students about the learning attainment they would present at the beginning of the class in which they would do so. This was done to prevent the group members from attempting to distribute the learning attainments among themselves and working on their part individually. Then, each group was asked to prepare a lesson plan (worksheets, activities, materials and so forth) in accordance with the recommendations in the elementary school mathematics curriculum and the theoretical lectures.

Lesson planning took place in two stages. In the first stage, the group members were involved in individual planning for each of the attainments assigned to their group. Then, they met and worked together to come up with a draft lesson plan for each attainment. In the second stage, the instructor held meetings with one or two groups every week to examine their draft lesson plans. They were given feedback and advice on their strengths and weaknesses and how to improve their lesson plans. Finally, the group members revised their lesson plans in accordance with the feedback and advice provided by the instructor.

Every week one or two groups taught their lesson plans for 20 to 25 min in artificial classrooms where their peers played the role of students. Each teaching session was followed by feedback and advice by the instructor and peers of other student groups.

Mathematics Instruction II involved two activities. The first activity, in which the prospective teachers were asked to do a project on the relationship between mathematics and daily life, was further divided into two parts. The first part was theoretical, and the instructor explained a sample project and its procedures for four weeks. In the second part, which was practical, each prospective teacher was asked to reflect on the relationship between mathematics and daily life and to identify five researchable topics on their own. Then, the group members were told to work together on the draft topics identified by the members and to decide on five researchable topics as a group. Each group presented their topics, along with the rationale for them, in the classroom. Each presentation was followed by feedback given by the instructor and peers on the researchability of the topics. Then, the final topics were specified for each group as a result of class discussion with the instructor's approval. Each group prepared its project in accordance with the procedures explained in the theoretical part and

presented them for 10 to 15 minutes every week. The presentations were followed by instant feedback and advice by the instructor and peers according to suggestions of Butler and Winne (1995), Kluger and deNisi (1996) and Hattie and Timperley (2007). Thus, the procedures for the projects were completed in ten weeks of weekly preparations and presentations.

For the second activity, each prospective teacher was expected to contact an elementary school teacher to decide on a learning attainment for mathematics and to design an implementation in an authentic classroom in the same way they had learned during Mathematics Instruction I. After they had identified their learning attainments, the prospective teachers individually prepared their draft lesson plans, activities and materials. Then, they submitted them to the instructor and their peers. Next, they revised them in accordance with the feedback and advice given by the instructor and their peers. Afterwards, they taught their lesson plan in the classroom of the elementary school teacher they had contacted in the beginning. The other members of their groups observed the teaching and provided peer assessment and feedback. In this way, the prospective teachers were provided with feedback by both the instructor and their peers on their lesson plans, activities and materials; however, their teaching was only followed by peer feedback.

METHOD

Qualitative research methodology was used to identify the views of the prospective teachers on the characteristics of the feedback provided by the instructor and their peers and its contribution to their learning during Mathematics Instruction I and II, two courses taught in the department of Elementary School Education (Yıldırım and Şimşek, 2003).

Participants

The study was conducted with 40 prospective classroom teachers (33 females and 7 males) who took Mathematics Instruction I and II during the 2013-2014 academic year as part of the curriculum of the department of Elementary School Education at Nigde University. This sampling corresponds to a Complete Target Population that "involves interviewing and/or observing everyone within a group of interest" (Patton, 2015, p. 285).

Data collection

The data were collected using a survey form that contained five open-ended questions designed for the purpose of the study. This survey was applied at the end of the summer semester. Prospective teachers were voluntary participated to the survey. Students were asked not to write their name on the survey. Each prospective teacher gave a written response in class with the presence of the instructor to the questions considering the feedback provided by the instructor and their peers.

The questions on the survey form were:

1) What does feedback mean to you? Explain in detail.

2) What characteristics do you think feedback should have? Explain in detail.
3) Considering the feedback you were given during Mathematics Instruction I and II,
a) Explain the extent to which the feedback provided by the instructor conformed to the characteristics of the feedback you listed as an answer to Question 2 and make reference to the feedback you were given.
b) Explain the extent to which the feedback provided by your peers conformed to the characteristics of the feedback you listed as an answer to Question 2 and make reference to the feedback you were given.
4) Considering the feedback you were given during Mathematics Instruction I and II,
a) Explain in detail whether the feedback provided by the instructor contributed to your assignments (your project, teaching sessions and activities you did in the artificial and authentic classrooms) and give examples.
b) Explain as a student in detail whether the feedback provided by your peers contributed to your assignments (your project, teaching sessions and activities you did in the artificial or authentic classrooms) and give examples.
5) Considering the feedback you were given during Mathematics Instruction I and II, would you like to receive feedback from the instructor or your peers? Why? Explain and justify your views.

Data analysis

The prospective teachers' responses to the open-ended questions were scanned and saved as picture files. After the researcher and a specialist examined the data set, they identified the themes to be used in the qualitative analysis. Then, they used MAXODA 11, an analysis program for qualitative data and analyzed the data set separately. The inter-coder reliability was $\alpha=0.89$.

The researcher and specialist studied together the codes and subcodes they had separately identified, highlighted the similar ones, negotiated the dissimilar ones, reached an agreement and generated common codes and themes (Merriam, 1988; Yin, 1994). These themes, subthemes and codes were finalized in accordance with two domain experts. This procedure was essential to enhance the reliability and to verify the codes and themes. Then, MAXMaps, a feature of MAXODA, was used to create graphics for the themes, subthemes and codes. Accompanied by the relevant frequencies and percentages, the graphics are presented in the findings section, which also includes direct quotations regarding each code from the prospective teachers, who were assigned numbers ranging from 1 to 40 (e.g., PT5, for prospective teacher 5). The theoretical frameworks of Brookhard (2008) and Tunstall and Gipps (1996) were used to link codes and themes each other.

Validity and reliability

This study took into account the validity and reliability measures recommended for qualitative research (Yıldırmm and Şimsek, 2003). For internal validity, the prospective teachers were asked to give sincere responses to all the questions on the survey form and to consider the feedback they had received during Mathematics Instruction I and II. For external validity, an attempt was made to present the findings in a manner consistent with the research questions.

Attempts to ensure external reliability involved the identification of the researcher's position, the definitions of the educational processes studied, the conceptual framework used for the data analysis, the specification of the codes and themes (Figures 1-6) and detailed explanations of the data collection and analysis methods. For internal reliability, the researcher and a specialist

FINDINGS

The purpose of this study was to identify the views of the prospective teachers on the characteristics of the feedback provided by the instructor and their peers during Mathematics I and II and its contribution to their performance.

The data were analysed, and the findings were presented with tables and explanations and then interpreted. Since some responses were grouped under more than code, the percentages may exceed 100%.

Prospective teachers' perspectives on feedback and its desired characteristics

The first research question was as follows: "*What are the views of the prospective teachers on feedback and its desired characteristics?*" Analyses show that prospective teachers consider feedback as positive or negative information about their performance however they don't consider as information about things done properly. The findings for this question are shown in Figures 1 and 2.

The views of the prospective teachers on feedback were grouped under five codes (Figure 1). More than half of them described feedback as positive or negative information about performance. PT6 exemplifies this code.

[PT6]: Feedback refers to comments by peers or teachers on an assignment or work that someone has done or presented. Related to performance, feedback can be positive or negative. It means peers or teachers giving positive or negative information about what one has done poorly or well.

PT39 proposed a similar definition.

[PT39]: Feedback is positive or negative criticism from our peers or you of the good or not so good aspects of our assignments, presentations and reports.

Viewing feedback as criticism of someone else's work, PT26 proposed the following definition.

[PT26]: It is an external assessment of the work. That is, it is positive or negative criticism to reveal its quality.

Those participants who described feedback as positive or negative information about performance did not consider the guiding aspect of feedback or its contributions to performance. Even so, 35% of the prospective teachers defined feedback as information that guides (correcting mistakes or deficiencies). One of them was PT14.

[PT14]: Instead of criticizing positively or negatively, feedback should give an idea of what should be done to improve an assignment and show the person doing it what to do.

Here are the words of another prospective teacher who emphasized the guiding aspect of feedback and proposed a similar definition.

[PT20]: It is guidance that we give to others during the communicative process so that they can correct any deficiencies and better their assignments.

More than a quarter of the prospective teachers (27.5%) viewed feedback as information that points out mistakes or deficiencies. PT2 defined the term in this way.

[PT2]: Assignments by individuals or groups are examined by others (teachers or peers) and poor aspects or deficiencies are reported.

Considering what was done during the courses, PT2 described the term in a similar way.

[PT22]: Feedback means examining the stages of an assignment, project or other activities, evaluating the peer who does it and informing them of its deficiencies.

Those prospective teachers who defined feedback as pointing out deficiencies and mistakes or positive or negative information about performance neglected one property of feedback: offering guidance to help improve an assignment or performance.

Only a few participants considered feedback to be information that triggers in-depth thinking and information about things done well. Those who chose the former description reported that feedback should enable people to look at their assignments in different ways and thus improve them. PT8 and PT14 explained this view.

[PT8]: Feedback is an assessment that sheds light on a person's ideas and thoughts about a certain event or situation and enables them to look at what they are doing in a more comprehensive and detailed manner. Our assessment should help others improve their ideas and thoughts.

[PT14]: Instead of criticizing an assignment positively or negatively, feedback should inform others and enable them to think about and form an opinion about what should be done. It should enable them to see their past and future.

The prospective teachers who defined feedback as information about things done well emphasized that feedback should increase motivation and reinforce desired behaviour. PT24 and PT35 expressed this idea.

[PT24]: It is an assessment of the positive aspects of an activity or project. Basing the assessment on positive
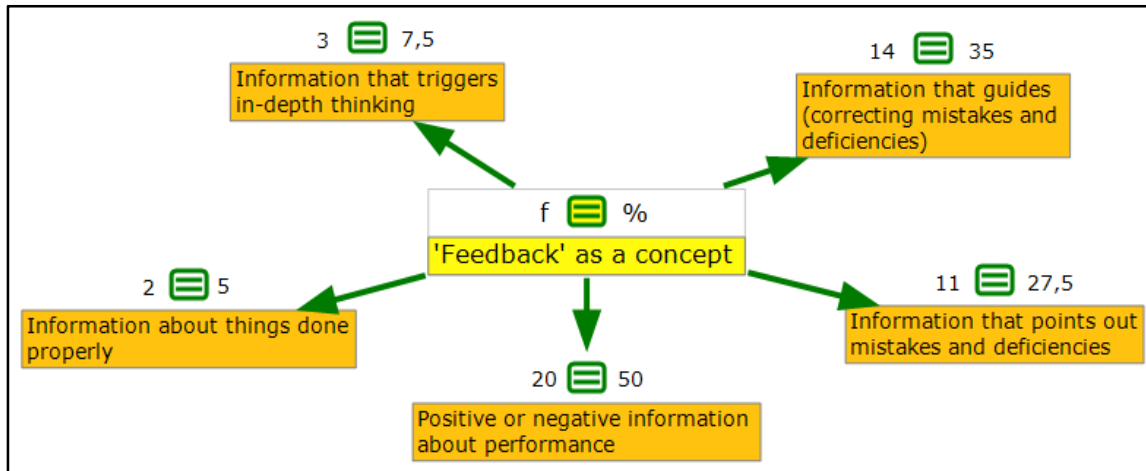
Figure 1. The distribution of the answers about feedback.
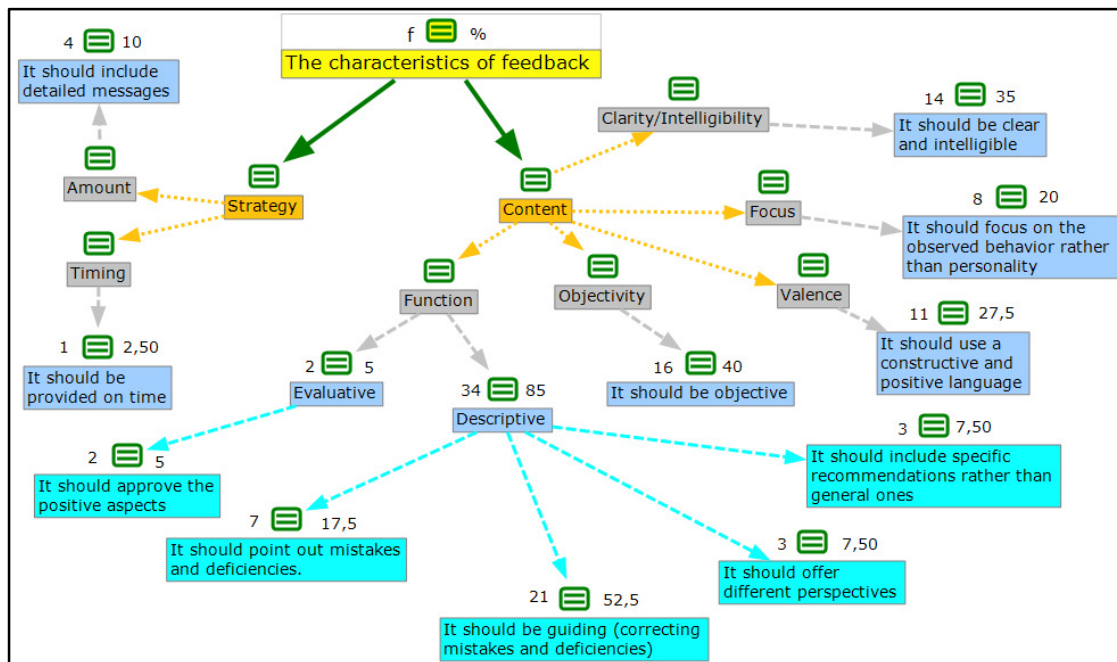
Figure 2. The distribution of the answers about the desired characteristics of feedback.

aspects rather than negative ones will lead to increased motivation.

[PT35]: It is an assessment that reinforces desired behaviour demonstrated by students in their activities or projects.

Figure 2 presents the distribution of the themes, categories and codes concerning the prospective teachers' views on the desired characteristics of feedback.

When the data were coded, two main themes were generated: strategy and content. The former was composed of two subthemes, namely, the amount and timing, whereas the latter consisted of five subthemes, namely function, objectivity, tone, valence, focus and clarity/intelligibility.

The majority of the participants (85%) stressed the descriptive function of feedback, while only a few of them (5%) emphasized its evaluative function.

More than half of the participants (52.5%) reported that feedback should guide them how to correct mistakes or

deficiencies. An example of these participants could be PT8 and PT22, who also highlighted some other characteristics.

[PT8]: Feedback should be objective and useful. It should be explanatory, not general. For example, it should not be like, "You did this," "You should not have done this," or, "You did not do that." Instead, it should be like, "It would be better if you could add this to your assignment." The advice should shed light on deficiencies and guide you how to correct them.

[PT22]: Feedback should be provided objectively without considering friendship or belonging to groups. Feedback should point out, with justification, what deficiencies there are and how they can be corrected. Also, things that are already being done well should be supported with positive comments.

About the other codes for feedback's descriptive function, 17.5% of the prospective teachers said that feedback should point out deficiencies or misconceptions. In addition, 7.5% of them reported that it should provide new insights. Another 7.5% noted that it should give specific rather than general advice. For instance, PT3 and PT4 emphasized these characteristics of feedback as well as some other characteristics concerning the other dimensions.

[PT3]: Feedback should be clear and intelligible. Those who receive it should be able to identify what deficiencies or mistakes there are. In addition, feedback should be provided in detail. It should not be superficial.

[PT4]: It should be multifaceted. That is, it should enable students to look at their assignments from a variety of perspectives. The feedback should be about the whole assignment, not just a part of it. It should convey specific rather than general messages.

In terms of content, 40% of the prospective teachers said that feedback should be objective, and 35% reported that it should be clear and intelligible. More than a quarter of them noted that it should use constructive and positive language. One-fifth of them stressed that it should focus on the observed behaviour rather than personality. PT2, PT7 and PT9 expressed these views.

[PT2]: It should present the most objective information about the work. It should be clearly understood by others, and it should fully describe any deficiencies.

[PT7]: I think feedback should not target any person. That is, if I have explained a topic, the feedback should be about the topic, not me. The person who gives the feedback should be objective. It should make positive and negative comments as well as guidance.

[PT9]: Feedback should be constructive. It should give positive advice on how an assignment can be improved, and it should be objective. It should also be clear and intelligible.

In terms of the desired amount of feedback, 10% of the prospective teachers said that it should convey detailed messages. Only one of them emphasized that feedback should be provided in a timely fashion. PT5 and P32 emphasized these characteristics of feedback and others.

[PT5]: It should be able to correct mistakes or deficiencies. Also, it should be provided immediately, not later.

[PT32]: Feedback should be detailed and supplementary. It should include detailed information about what should be done, and it should be supplementary. It should be objective, too.

Characteristics of the feedback provided by the instructor and their peers

The second research question was: *"What are the views of the prospective teachers on the characteristics of the feedback provided by the instructor and their peers?"* The majority of the prospective teachers reported that the instructor's feedback during Mathematics I and II was descriptive yet they didn't report evaluative characteristics of feedback. The findings for this question are shown in Figures 3 and 4.

Figure 3 shows the distribution of the themes, categories and codes generated when the data for the participants' views on the characteristics of the instructor's feedback were coded.

According to 92.5% of the participants, the instructor feedback guided them on how to correct mistakes or deficiencies. Also, 10% of them said that it focused on the positive and negative aspects at the same time. A small percentage (7.5%) reported that it gave specific rather than general advice, and another 7.5% emphasized that it provided new insights. PT1, PT7, PT11 and PT16 stressed these descriptive characteristics and others regarding strategy and content.

[PT1]: The feedback you provided enabled us to look at our project topic in a different way. It was guiding. It was especially useful for the topic we were supposed to research for our project. For example, it helped us to shape our weekly assignments such as specifying our research questions and choosing the people that we were going to meet.

[PT7]: The feedback by the instructor was definitely objective. The comments were not about us or our
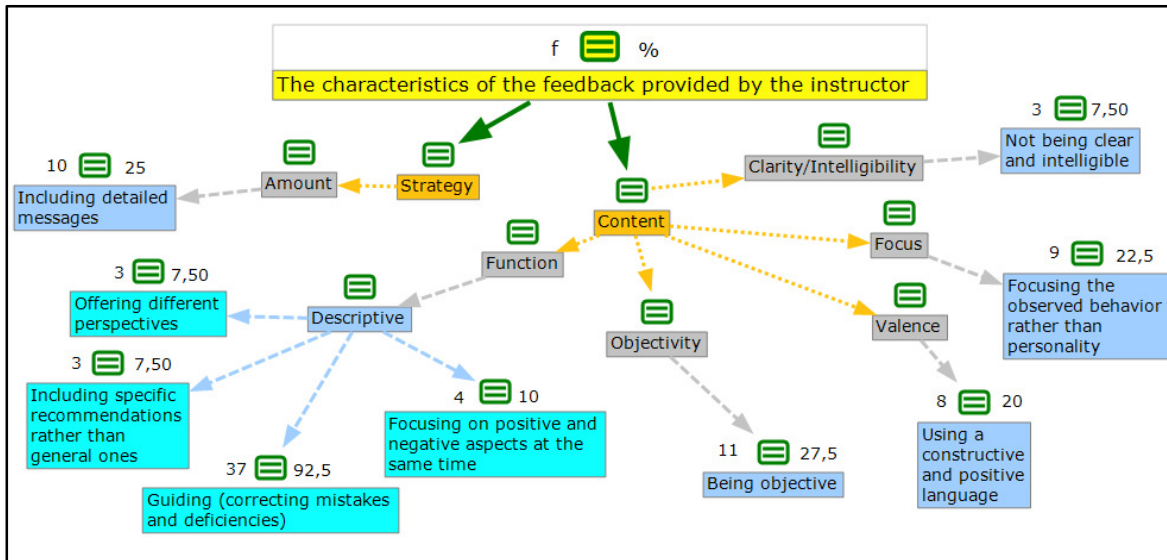
Figure 3. The distribution of the answers about the instructor feedback.
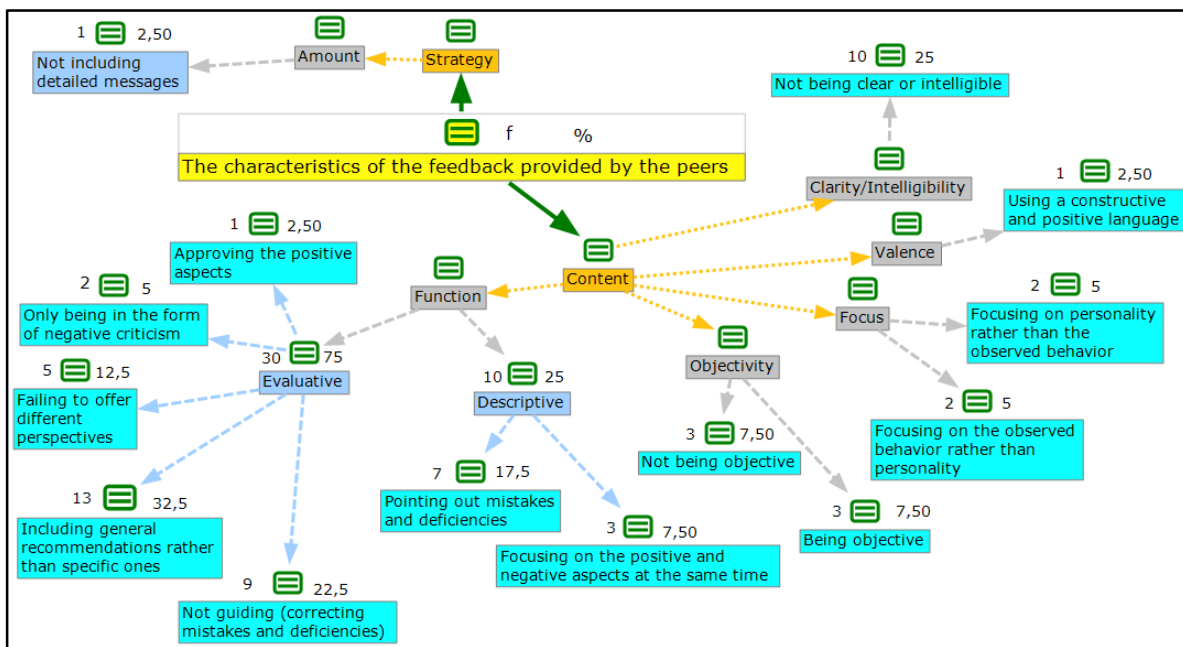
Figure 4. The distribution of the answers about the peer feedback.

personality. Instead, they focused on the deficiencies in our assignments and how we could correct them. The instructor never said, "You are like this or that," but only considered our assignments and presentations. The instructor's feedback was not only positive, but also guided us how to correct deficiencies. For example, the instructor liked the introduction of our project, but pointed out the deficiencies in other sections and explained how to correct them without ever being offensive at all.

[PT11]: Your feedback in the first term made a significant contribution to my work. If I feel ready to teach mathematics, I owe you a lot. Your feedback was objective and useful. I prepared and presented the lecturing assignment in accordance with your feedback. For example, I was going to lecture on addition. When I got prepared and talked to you, you told me that my draft plan was teacher-centered. You provided feedback on how I could adapt it to constructivism, and it was very

useful.

[PT16]: The feedback provided by the instructor was purely objective. It was related to the purpose and content of the assignment, not our character. The instructor not only told us how to correct our mistakes, but also explained why some of the things we did were already good. The instructor's feedback always shed light on our assignments because it was always in the form of specific information about what we should do.

[PT28]: The feedback we were given during the courses provided an opportunity to correct the things we failed to understand or do during the courses. It was not meant as criticism or finding faults. It helped us correct deficiencies. It was always constructive and positive.

In addition to its descriptive characteristics, the instructor feedback was also evaluated in terms of objectivity, valence, tone, focus and intelligibility. According to 27.5% of the prospective teachers, the feedback was objective. Similarly, 22.5% of them reported that it focused on the observed behaviour rather than personality. The responses of PT7 and PT28 above exemplify these views. Even so, 7.5% of the participants said that the instructor feedback was not clear or intelligible. PT23 and PT37 expressed their views as follows.

[PT23]: Your feedback was not clear enough, for mistakes and deficiencies persisted even though you provided feedback on them in every class.

[PT37]: The sentences in your feedback were sometimes unclear, or I couldn't understand them. So I had difficulty figuring out what I should do for the project.

According to a quarter of the prospective teachers, the instructor feedback conveyed detailed messages. This was emphasized by PT9 and PT21, who also commented on some other characteristics.

[PT9]: You gave advice to get better results. Your feedback was detailed. It was not haphazard. You explained and justified your advice in detail.

[PT21]: The feedback by the instructor was more than detailed. It not only pointed out deficiencies, but also helped us to correct them. For example, the instructor checked our projects and gave advice on a weekly basis, which was quite useful.

Figure 4 presents the distribution of the themes, categories and codes generated when the data for the participants' views on the characteristics of the peer feedback were coded.

When the data were coded, two main themes emerged: strategy and content. The former had a subtheme (amount), whereas the latter was composed of five sub-themes (function, objectivity, tone, focus and intelligibility).

The majority of the prospective teachers reported that the peer feedback in Mathematics Instruction I and II was evaluative (Figure 4). As for the codes, 32.5% of them said that it gave general rather than specific advice, and 22.5% of them noted that it did not offer guidance to help correct mistakes or deficiencies. In addition, 12.5% of them stressed that it failed to provide new insights. PT1, PT2, PT4, PT20 and PT21 expressed these views.

[PT1]: Actually, I don't think the feedback given by our peers provided new insights. It was far from enabling us to look at our assignment in different ways and to make it better.

[PT2]: The feedback given by our classmates was too general. Even though it pointed out deficiencies, it did not inform us about how to correct them.

[PT4]: It would be wrong to say the feedback we received from our peers was enough. Instead of guiding us, it was too general and brief. For example, it was in the form of general statements such as, "The problem should be fixed," or, "References should be added," but it did not inform us about how to put the advice into action.

[PT20]: The feedback given by our peers was mostly about things that we were already aware of, but did not know what do to about. So it did not even take us a step further.

[PT21]: The feedback we got from our peers was not useful since it did not give any advice. It was only in the form of statements like, "This should be done." But we were already aware of this! It did not contribute to our assignment since it was not supported by potential solutions or ideas.

A small percentage of the prospective teachers (5%) said that the peer feedback was only in the form of negative criticism, a situation described by PT5.

[PT5]: The feedback given by my peers was not very effective. It did not affect me much since it was in the form of negative criticism rather than a helpful contribution.

On the other hand, PT28 said that the peer feedback "concerned the positive aspects and it did not express criticism or attempt to correct the deficiencies." In other words, the feedback only focused on the positive aspects of their assignments.

A large number of the prospective teachers noted that the feedback they received from their peers was descriptive. According to 17.5% of them, it pointed out deficiencies or misconceptions, and 7.5% of them

reported that it focused on the positive and negative aspects. PT10, PT35 and PT38 expressed these views.

[PT35]: The feedback given by my peers enabled me to understand both the positive aspects of my study and the mistakes in it.

[PT38]: Even though the feedback given by my peers enabled me to identify the positive and negative aspects of my assignment, it was not useful because it did not offer a solution like, "It will be better if you do this." It only pointed out deficiencies and good aspects.

[PT10]: Without straying from the point, our peers reported, in an objective and critical manner, what should be done, what deficiencies there were, and what should be added.

In addition to its evaluative and descriptive characteristics, the peer feedback was also evaluated in terms of objectivity, valence, tone, focus and intelligibility. According to 25% of the prospective teachers, it was unclear or unintelligible. One of the participants with this idea was PT40.

[PT40]: The feedback given by our friends was too general. It did not make significant contributions to us since it was not clear or intelligible. Your feedback was more intelligible.

According to 75% of the prospective teachers, the peer feedback was objective, whereas 7.5% of them said that it was not objective. An example of the former group of teachers was PT10, whose views were quoted above. As for the latter, PT30 made this comment.

[PT30]: My peers were not competent enough to provide feedback. Their feedback was far from being objective. It was dominated by their egos.

While 5% of the prospective teachers said that the peer feedback focused on the observed behaviour rather than personality, another 5% reported that it focused on personality rather than the observed behaviour. PT7 and PT16 expressed this view:

[PT7]: The feedback given by our peers did not include any offensive remarks. That is, it was in the form of comments on our assignments and presentations rather than targeting us.

[PT16]: Much of the feedback given by my peers did not bear the hallmarks of objectivity. In particular, the feedback that we got when we did our own lecturing as part of the Mathematics Instruction I course was not about our lecturing. It targeted my own personality.

Only one of the prospective teachers reported that the peer feedback used constructive and positive language.

[PT9]: The feedback given by my friends involved constructive and positive statements, but it was not detailed. It was general. It did not offer much guidance.

Another prospective teacher (PT32) noted that the peer feedback did not convey detailed messages.

[PT32]: The feedback given by my friends was rarely detailed or objective. So it did not contribute to our assignment.

Contributions of the instructor and peer feedback to performance

The third research question was: "What are the views of the prospective teachers on the contributions of the instructor and peer feedbacks to their performance?" The prospective teachers said that the instructor feedback made a positive contribution to their performance. The findings for this question are shown in Figure 5. The views of the participants were grouped under two main themes, namely the contributions of the instructor feedback and the contributions of the peer feedback. According to 83.5% of them, it enabled them to improve on their assignments. PT7 described the contributions of the instructor's feedback.

[PT7]: The feedback given by the instructor was profoundly effective in our projects and assignments. This is because the instructor constantly provided us with feedback that guided us. Thanks to this feedback, we learned what to do to improve our assignments. It made a significant contribution.

Similarly, PT24 noted that the instructor's feedback contributed to the lesson plan prepared as part of the course.

[PT24]: The feedback you provided made a positive contribution to my work. When I submitted my lesson plan to you, you provided with me some feedback on it. I, in turn, made the best of your feedback to make the plan more functional.

According to 32.5% of the prospective teachers, another contribution of the instructor's feedback was that it enabled them to learn by doing and experiencing. PT4 and PT26 expressed this view.

[PT4]: This was the first time we had done such a project. We had no idea how to do it. The feedback you provided was good guidance for this. We learned by doing and experiencing because we carried out the project step by step, and you provided us with feedback that guided us about our deficiencies every week.

[PT26]: It helped me a lot with the activities I did in the
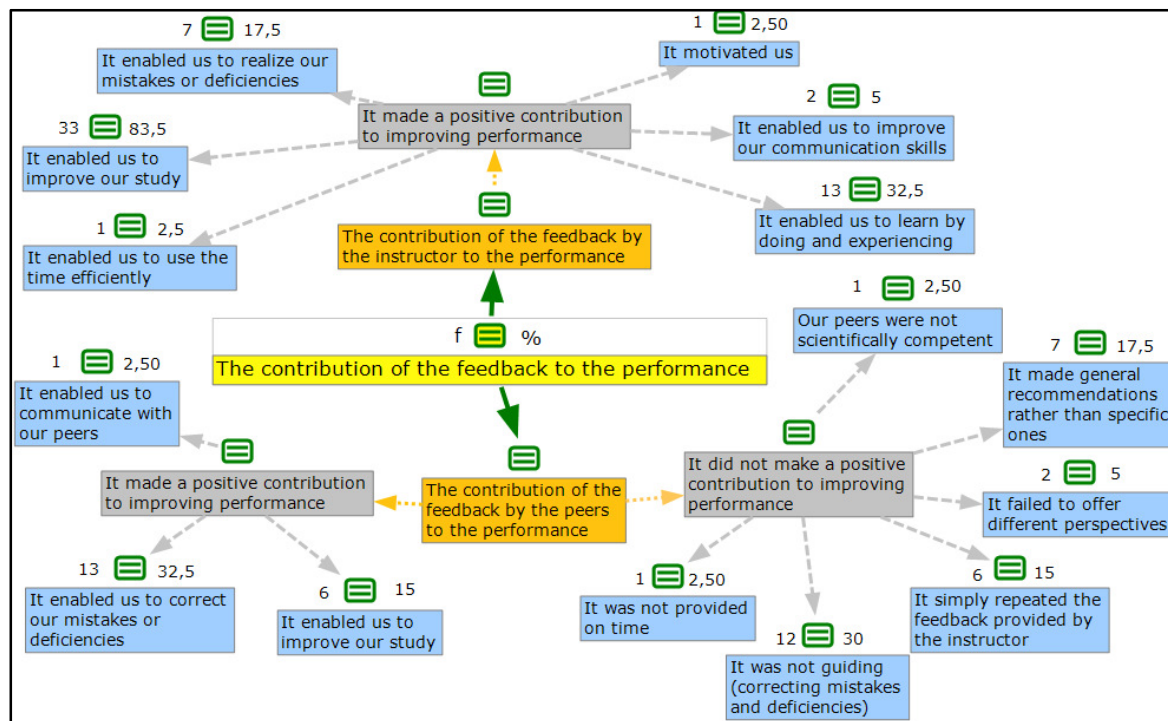
Figure 5. The distribution of the answers about the contributions of the feedback to the performance.

real classroom. Thanks to the feedback we received during Mathematics Instruction I, I learned how to prepare a lesson plan, worksheet or material appropriate for the mathematics curriculum and how to have students work as a group. I took this feedback into account while I was getting prepared for the exercise that followed. To me, it was a rehearsal for teaching.

According to 17.5% of the prospective teachers, the instructor's feedback enabled them to identify their mistakes or deficiencies. An example of these teachers is PT35, who referred to the instructor feedback given during the project design.

[PT35]: During the project design, your weekly feedback enabled us to identify our mistakes or deficiencies. Similarly, we identified the deficiencies or mistakes in our draft project poster thanks to your feedback.

One of the prospective teachers said that the instructor's feedback enabled them to use time efficiently. Another participant reported being motivated by it. Also, two participants noted that it enabled them to improve their communication skills. Here are some of these views.

[PT5]: It helped us improve on our assignment. We assessed and implemented feedback about mistakes or deficiencies. Also, we were motivated by the feedback on the positive aspects of our assignment.

[PT13]: The feedback given by the instructor enabled us to use time efficiently. That is, we saved time in our attempts to correct mistakes or deficiencies thanks to guidance from this feedback.

[PT39]: Yes, it made contributions. Especially in the group work activity, I had difficulty in the beginning, but your feedback enabled me to enhance my communication with the group. Before your feedback, we had limited discussions about our assignment. That is, your feedback allowed us to look at our assignment in different ways and gave us much more to discuss.

On the other hand, the views on the peer feedback were less uniform. Some participants said it made a positive contribution to their performance, while others did not agree. According to 32.5% of the participants, the peer feedback enabled them to correct mistakes or deficiencies, and thus made a positive contribution to their performance. PT11 and PT26 expressed this view.

[PT11]: Some feedback provided by our peers literally pointed out the deficiencies in our assignment. We considered their ideas and revised it accordingly. Thus, it made a positive contribution.

[PT26]: As a student, I found it quite useful to be evaluated by my peers and be informed about deficiencies and how to correct them.

In addition, 15% of the prospective teachers reported that the peer feedback enabled them to improve on their assignments and thus contributed to their performance. PT25 and PT36 expressed this view.

[PT25]: It made a contribution. For example, during the project design, I did not think that our sub-problems or findings were incomplete, but we identified and corrected the deficiencies and then submitted the project thanks to feedback from our peers.

[PT36]: It made a positive contribution. Especially the feedback by the members of the other groups contributed to our project. We took their perspectives and recommendations into account to revise the finding section of our project.

Only one of the prospective teachers emphasized the communicative aspect of the process.

[PT13]: The feedback we received from our peers enabled us to keep in touch with them. For example, we constantly communicated with one another while planning our lesson plans. We benefited from each other's ideas. We helped each other to prepare materials, games and activities appropriate for the grade level. This had a positive influence on our performance.

More than a quarter of the participants (30%) reported that the peer feedback did not make a positive contribution to their performance because it was not guiding. PT21 and PT39 expressed this view.

[PT21]: The feedback we received from our friends was not useful since it did not give any advice. It was like, "This should be done." We were already aware of this! It did not make any contributions since it was not supported by potential solutions or new ideas.

[PT39]: The feedback provided by my classmates was far from guiding. It was too superficial. Therefore, it did not make a significant contribution to my work, unfortunately.

According to 17.5% of the prospective teachers, the peer feedback did not make any contributions to their performance because it gave general rather than specific advice. For example, PT8 and PT37 said that the peer feedback was too general and did not include any specific information.

[PT8]: It did not make any contribution. That is because it was either a general comment on our assignment or a repetition of what the instructor had already said.

[PT37]: Not much, since the feedback by the friends was too general. It did not include specific information about what sections of our assignment we should

improve.

In addition, 15% of the prospective teachers reported that the peer feedback was a repetition of the instructor feedback and therefore they chose to consider the latter instead of the former. PT8 expressed this idea above. A similar view was expressed by PT2.

[PT2]: The feedback given by our classmates did not make much of a contribution since it was about deficiencies that had already been identified by the instructor.

One of the participants said that the peers could not provide useful feedback since they were not scientifically competent.

[PT16]: The feedback given by our friends did not make significant contributions to our assignment. Since they had incomplete scientific information, they failed to give useful advice.

Moreover, two prospective teachers said that their peers failed to provide new insights. PT20 commented on this.

[PT20]: The feedback given by our peers did not make much of a contribution. That is because it was not qualified enough to enable us to look at our assignment in different ways. They provided feedback on the same aspects that we had already identified.

One of the participants said that the peer feedback did not make a positive contribution to their performance because it was not given in a timely fashion.

[PT5]: The feedback provided by our peers did not make any contribution to our assignment since it was provided later, not immediately.

Preferences of prospective teachers for receiving feedback

The fourth research question was: *"What are the preferences of the prospective teachers for receiving feedback?"* Analyses show that prospective teachers mostly prefer receiving feedback from instructor. The findings are shown in Figure 6.

Whereas some of the participants preferred to be provided with feedback only by the instructor, others wanted to be given feedback by both the instructor and their peers.

Less than one-fifth of the participants (17.5%) preferred to receive feedback from both the instructor and their peers because they thought this would provide new insights into their assignments. PT1 and PT21 expressed this view.
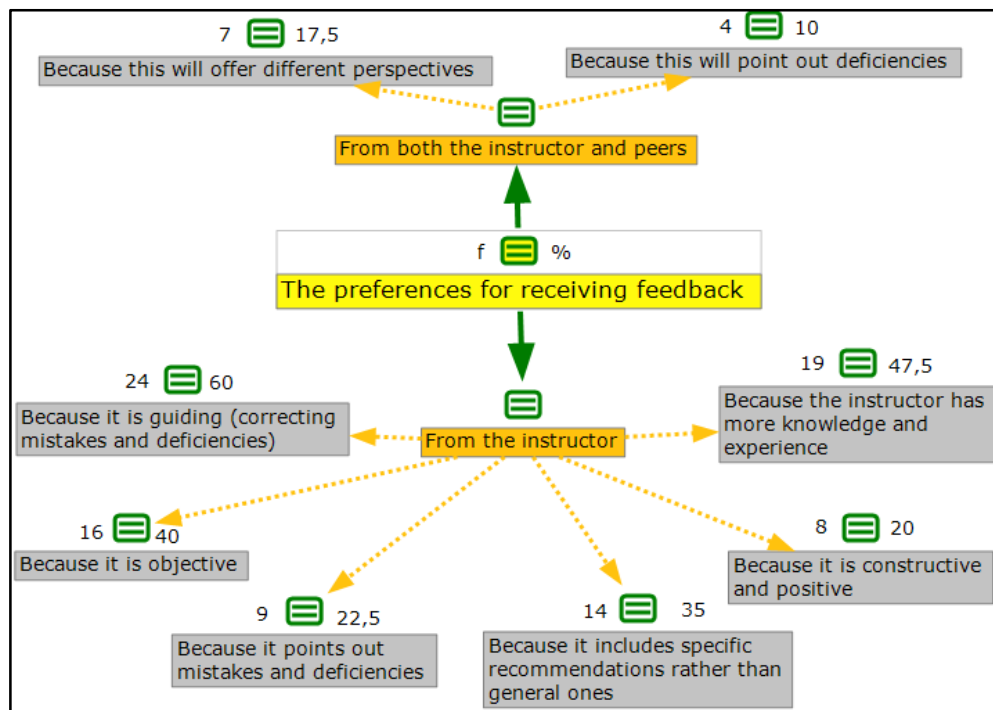
Figure 6. The distribution of the answers about the preferences for receiving feedback.

[PT1]: I would like to get feedback from both the instructor and my peers or other friends. That is because I believe the more perspectives on my work there are, the closer it will be to what is considered good.

[PT21]: Both the instructor and our peers have ideas that are vital to our assignments. As a trained specialist, the instructor's guidance definitely contributes to our assignments. Similarly, different ideas of our friends contribute by providing new insights. This allows us to look at our assignments in a different way. This, in turn, helps us to improve.

Similarly, 10% of the prospective teachers preferred to get feedback from both their peers and the instructor because they thought different sources of feedback would enable them to identify the deficiencies in their assignments. PT3 offered an example of this view.

[PT3]: I would like to get feedback from both of them. That is because the better one can identify deficiencies, the easier it is to correct them.

On the other hand, the views of the prospective teachers who preferred to receive feedback only from the instructor were grouped under six headings. More than half of the participants (60%) noted that the instructor feedback was guiding. PT5 and PT6 expressed this view.

[PT5]: I prefer to get feedback from the instructor. This

is because the instructor feedback is guiding and thus usable. However, the peer feedback is mostly criticism and thus not useful.

[PT6]: Considering the feedback I received during the courses, I would prefer to get feedback from the instructor. This is because the instructor can assess my performance more accurately and objectively. The instructor is better at spotting deficiencies and giving advice on how they can be corrected. Since our peers cannot assess and provide feedback as well as the instructor can, their feedback is not as useful.

In addition, 47.5% of the prospective teachers preferred feedback from the instructor because the instructor could provide more useful feedback thanks to having more knowledge and experience. PT39 exemplifies this view.

[PT39]: I certainly don't want to get feedback from my peers on topics as part of Mathematics Instruction I and II. This is because all they do is to criticize, and they never introduce new ideas or advice. I would like to get feedback from the instructor, since the instructor has more knowledge and experience, monitors the process in a better way and offers a wider variety of advice and ideas.

Also, 40% of the prospective teachers preferred to get feedback from the instructor because it was more objective. PT6 expressed this view above.

Another reason for this preference was that the instructor's feedback gave specific rather than general advice. PT16 identified the characteristics of the feedback given by the instructor.

[PT16]: Considering the feedback we received during Mathematics Instruction I and II, my peers gave more general and superficial feedback in the form of criticism. Thus, I would prefer to get feedback from the instructor, whose feedback is more objective and includes more accurate and specific information. It also guides us and helps us to correct deficiencies.

According to 22.5% of the prospective teachers, the reason for preferring to get feedback from the instructor was that it enabled them to identify their mistakes and deficiencies. PT17 exemplifies this view.

[PT17]: Of course, I would prefer to get feedback from the instructor. The instructor has a better command of the topic and is better at spotting mistakes and deficiencies because of this. Thus, the instructor can provide more detailed feedback on our assignments.

Finally, one-fifth of the participants preferred feedback from the instructor because it was more constructive and positive. This view was expressed by PT11.

[PT11]: I would prefer to get feedback from the instructor because it is more constructive and positive. It improved us. The feedback that I got from my peers was often in the form of criticism. Thus, it did not make a significant contribution to my work.

DISCUSSION AND CONCLUSION

Even though the participants' attempts to describe feedback focused on different dimensions of the concept, they tended to emphasize its formative function. Half of the prospective teachers described feedback as "positive or negative information about performance". This description is similar to that of Hattie and Timperley (2007), who described the concept as information from a variety of sources such as teachers, peers, books and parents about one's accomplishment (performance) and comprehension. This description is also similar to the definition proposed by Butler and Winne (1995). According to them, feedback is information about students' learning processes and performance. The prospective teachers who defined feedback as positive or negative information about performance did so without considering the fact that feedback could improve performance. Even so, slightly more than one-third of the prospective teachers described feedback as information that guides them to correct mistakes or deficiencies. This description, which emphasizes feedback as guidance, is similar to that of Panasuk and Lebaron (1999), who

considered feedback to be information provided for students about their performance and guidance for improvement. In addition, nearly one-third of the participants described feedback as information that points out mistakes and deficiencies, and several other participants described it as information about things done well. There were also some participants who described it as information that triggers in-depth thinking, thereby emphasizing its formative function. These definitions proposed by the prospective teachers correspond to Bloom's (1979) definition of feedback. In brief, three dimensions of feedback are emphasized both in the described by the prospective teachers and the definitions in the literature. Feedback attempts to describe performance, to give guidance if there is a discrepancy between the performance and the desired performance and to trigger in-depth thinking so that the assignment can be analyzed in different ways.

The prospective teachers identified some desired characteristics of feedback, which were grouped in the categories of function, objectivity, valence, tone, focus and intelligibility. According to the participants, feedback should have several descriptive functions such as offering guidance to correct mistakes or deficiencies, pointing out mistakes or deficiencies, providing new insights and giving specific rather than general advice. Only a few prospective teachers thought that feedback should endorse the positive aspects of an assignment, thus emphasizing its evaluative function. The participants highlighted the descriptive functions of feedback rather than its evaluative function, and they were aware that feedback could improve performance. It is stressed in the literature that feedback should be descriptive to be useful. Peterson and Irving (2007) maintain that feedback should endorse students' good ideas, add new pieces of information to them, correct their misconceptions and enable them to improve their performance. Similarly, Guven (2004) emphasizes that feedback should be informative rather than evaluative, focus on primary objectives when assessing student development and help students to identify and correct their misconceptions.

The prospective teachers said that the content of feedback should focus on observed behaviour or performance rather than personality, an idea that is consistent with the literature. According to William (1999), feedback has an adverse effect on performance when it focuses on the student's personality. Thus, feedback should focus on the students' performance rather than on their personality or character. Likewise, Dweck (2007) holds that feedback that focuses on students' personality will not be useful because it does not provide them with information to use with their assignments.

The prospective teachers reported that feedback should also be clear and intelligible. This idea is already stressed in the literature. According to Brookhard (2008), using complicated words or sentences to provide feedback reduces its intelligibility. Similarly, McKeachie (1998) and Weaver (2006) note that teacher feedback

should provide students with intelligible information that they can use to improve their work.

Objectivity was also considered by the prospective teachers to be another desired characteristic of feedback. In order to be reliable, feedback should definitely be objective. In other words, it should include objective information about the work of the person who receives it. Apparently, the prospective teachers were already aware of this characteristic of feedback.

The participants noted that feedback should also use constructive and positive language. This idea is consistent with research results and implications in the literature. Ilgen et al. (1979), Kluger and deNisi (1996) and Hattie and Timperley (2007) emphasize that teachers should make positive comments to describe performance. Brookhard (2008) states that it is wrong to find fault with students' assignments, to point out mistakes without offering advice on how they can be corrected or to punish or discredit them for what they have done. In other words, teachers should give students positive valence feedback. Bernichon et al. (2003) and Mesch at al. (1994) assert that negative feedback causes certain student reactions such as a defensive way of speaking, denial and reduced motivation, which, in turn, lead them to develop a sense of desperation, to have reduced self-confidence and less academic success. Hence, students should be provided with positive valence feedback that increases their intrinsic motivation and helps them to improve their performance (Brinko, 1990; Coe, 1998). According to Brinko (1990), if negative feedback must be given, it should be sandwiched between pieces of positive feedback.

In terms of strategy, one-tenth of the prospective teachers thought that feedback should convey detailed messages, an idea supported by the literature. Butler and Winne (1995), Kluger and deNisi (1996) and Hattie and Timperley (2007) maintain that teachers should highlight key points for students, emphasize points associated with primary learning objectives and estimate the proper amount of feedback appropriate for their developmental stage. Brookhard (2008) acknowledges that the purpose of feedback is to provide students with enough information to understand what they are supposed to do, thereby emphasizing the importance of the amount of feedback.

Although the timing of feedback is very important in formative assessment, only one of the teachers stated that feedback should be given right away to be effective. Butler and Winne (1995), Kluger and deNisi (1996) and Hattie and Timperley (2007) hold that feedback should be given when students are reflecting on the learning objective and still dealing with the topic or assignment. Similarly, Brookhard (2008) maintains that there is no point in grading assignments or providing feedback two or three weeks after a test or unit has been completed or when there is no opportunity for students to improve their performance. According to Kulik and Kulik (1998),

Swindell and Walls (1993) and Bangert-Drowns et al. (1991), just-in-time feedback has a significant effect on student achievement. In their study of senior-year prospective teachers teaching the mentally handicapped, Erbas and Yucesoy (2002) found that immediate feedback on student performance is more effective than delayed feedback. Given that only one of them reported that feedback should be given right away, the prospective teachers were not aware of the role played by the timing of feedback in student performance. The prospective teachers should be shown sample research results to inform them about the importance of the timing of feedback.

The views of the prospective teachers on the characteristics of the feedback provided by the instructor and their peers (Figures 3 and 4) suggest that the instructor gave descriptive feedback, whereas the feedback given by their peers was evaluative. Nearly all the participants reported that the instructor feedback offered guidance about how to correct mistakes or deficiencies, but the peer feedback lacked this characteristic. In other words, the peer feedback did not tell the participants how to correct their mistakes or deficiencies. In addition, the participants reported that the instructor feedback provided new insights and gave specific rather than general advice on their assignments (performance), but the peer feedback did neither. Furthermore, they reported that the instructor feedback focused on the positive and negative aspects of their assignments (performance) at the same time, but the peer feedback was only in the form of negative criticism. Whereas the instructor gave the participants specific advice, they were given general advices by their peers. Davies (2003) emphasizes that descriptive feedback provides students with clear information about the accuracy of their assignments and therefore supports their comprehension. Similarly, Gipps (1999) notes that such feedback focuses on student development and progress and explains the positive and negative aspects. In brief, the views of the participants suggest that the instructor feedback was useful. This is also supported by the data on the contributions of the instructor feedback to performance.

A considerable percentage of the participants reported that the instructor feedback was objective, used constructive and positive language and focused on behaviour rather than personality. However, this was only sometimes the case for the peer feedback. In addition, a quarter of the participants said that the feedback provided by their peers was not clear or intelligible, but only three of the participants reported that the instructor feedback was not clear or intelligible. This suggests that the peers had difficulty providing clear and intelligible feedback and that the instructor was sometimes unable to do so. Chanock (2000) demonstrated that there is a discrepancy between what students understand from a feedback message and what teachers mean. Therefore, the author

emphasized that teachers should explain very carefully what they mean in a feedback message and thus help students interpret it accurately. Higgins et al. (2002) revealed that students would like their teachers to provide feedback that can help them to understand what they are studying. All these findings indicate that both instructors and teachers should do their best to make their feedback clear and intelligible. In addition, prospective teachers should be informed about what should be considered when giving feedback. To do so, they should be shown sample research results or model feedback from their instructor or their peers.

One of the prospective teachers said that the peer feedback did not convey detailed messages. On the other hand, a quarter of them reported that the instructor feedback conveyed detailed messages, suggesting that the instructor took into account the key points and primary learning objectives when giving feedback. In other words, the instructor feedback included enough information to enable the participants to comprehend the message.

The views of the prospective teachers on the contributions of the instructor feedback and peer feedback to their performance (Figure 5) suggest that the former always made a positive contribution to their performance. The latter, however, sometimes made a positive contribution to their performance and sometimes did not. According to a large majority of the participants, the instructor feedback gave guidance and helped them to improve their assignments. Similarly, nearly half of the participants reported that the peer feedback enabled them to correct their mistakes or deficiencies and to improve their assignments, thus making a positive contribution to their performance. Two other contributions of the instructor feedback were that it enabled the prospective teachers to learn by doing and experiencing and to identify their mistakes or deficiencies. In addition, some participants reported that the instructor feedback improved their communication skills and their ability to use time efficiently and increased their motivation. The peer feedback, on the other hand, did not make any contribution to their performance according to a considerable number of the participants, since it did not offer guidance, gave general rather than specific advice or repeated what the instructor had already said. Several other prospective teachers thought that the peer feedback was not useful because it was not given right away, did not provide new insights into their assignments and came from peers who were not scientifically competent. In brief, the prospective teachers did not receive proper feedback on how to improve on their performance from their peers. The prospective teachers will certainly become more and more scientifically competent as they gain experience and knowledge. Even so, they should be informed that the timing of feedback is of vital importance, and they should be encouraged not to repeat instructor feedback but to provide new insights.

The preferences of the prospective teachers for receiving feedback (Figure 6) indicated that a considerable number of them preferred to get feedback from the instructor because the instructor feedback offered guidance, included objective information, pointed out mistakes and deficiencies, gave specific rather than general advice, used constructive and positive language and came from a more knowledgeable and experienced source. On the other hand, some participants reported that they would like to get feedback both from the instructor and their peers because this would provide an opportunity to spot deficiencies in assignments and provide new insights. The underlying reason why a considerable number of the participants preferred to get feedback only from the instructor was because peer assessment is not common or popular in the Turkish education system. The renewed curriculum proposes it as an alternative method. Therefore, efforts should be made to make sure that prospective teachers learn this method during their university education. The fact that prospective teachers don't give importance to peer feedback could stem from two reasons. First, peer feedback could not be used in previous education (elementary, middle and high school) of prospective teachers. Second, importance of peer feedback could not be emphasized enough in their undergraduate education while courses are taught by different instructors. To overcome this situation, students should be asked to give feedback to their peers and should be used and awareness about the fact that peer feedback is an essential component of learning process should be created.

The data of this study were collected using redesigning Mathematics Instruction I and II courses by author. Experiences of the author and results from previous research in the literature have been effective in the redesigning process. Findings of this study revealed significance of peer feedback for prospective teachers. Results of the study showed that it would be more appropriate to emphasize on peer feedback during course and to compare feedback of prospective teachers with instructor's feedback. It could be thought that this can improve prospective teachers' awareness towards significance of peer feedback. Thus, prospective teachers could actively use peer feedback when they will be teachers.

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

Development of knowledge, awareness, global warming decreasing behavior and critical thinking of grade 11 students using the Four Noble Truths method with meta-cognitive techniques

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This study aims to investigate the effects of learning environmental education on the knowledge, awareness, global warming decreasing behavior, and critical thinking of eighty grade 11 students from two classes. The Four Noble Truths method with metacognitive techniques and traditional teaching method were used for the investigation. The sample was obtained by using cluster random sampling techniques. The Four Noble Truths method with metacognitive techniques was used for forty students that made up the experimental group while the traditional learning method was used for the control group consisting of forty students. The research instruments included five- lesson plans using the Four Noble Truths method with three metacognitive techniques : intelligibility, plausibility and wide-applicability (each plan consists of three hours learning per week); a knowledge test on global warming ; questionnaire on global warming awareness; questionnaire on global warming decreasing behavior; and a critical thinking test. The major findings revealed that the experimental group and based on prior Biology learning outcome had more knowledge, awareness, global warming decreasing behavior, and critical thinking prior to learning. The high Biology achievers had higher awareness of global warming in two areas, global warming decreasing behavior in one area and critical thinking than the lower Biology achievers in three areas. The experimental group had more knowledge, awareness of global warming generally and in one area, global warming decreasing behavior generally and in one area and overall critical thinking in three aspects than the control group students. In addition, there were statistical correlations between prior Biology learning outcome with learning model and global warming awareness, global warming decreasing behavior, and critical thinking.

Key words: The Four Noble Truths method, metacognitive techniques, global warming, awareness, critical thinking

INTRODUCTION

Nowadays, welfare and economic growth along with   excessive use of natural resources has become a

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dominant issue in many countries across the globe. About 70% of natural disasters currently occurring are the result of climate changes, and it seems that this trend is increasing (Preston et al., 2008). Studies have shown that despite international attempts to reduce the effects of global warming, the emission of greenhouse gases is trending up. This is because the emission increase rate from developing countries is greater than that of developed countries. It is predicted that this condition will become more critical in future (UNDP, 2008). Global warming occurs mostly by burning fossil fuels such as petroleum, coal and natural gases (WMO, 2013). The greenhouse gases (carbondioxide, methane, nitrous oxide, chlorofluoro carbon) can prevent the release of heat from the earth surface into space by adsorbing infra-red radiation. This increases the world temperature (UNESCO and UNDP, 2011a). This phenomenon can have consequent impacts on environments such as an increase of sea water level due to the melting glaciers in the world polar zone (UNESCO and UNEP, 2011b), drought, lack of water, desert expansion, and severe weather conditions (heavy rain, floods, and cyclones) (Leighton, 2011). Increased temperature causes the outbreak of malaria and diarrhea. In Thailand, the Ministry of Education emphasizes that education is the essential way for sustainable development and integrating the fusion of environmental education into the whole process of education at primary and secondary levels. Environmental education develops learners' knowledge, attitude awareness, skills, and participation in solving environmental problems (Winscons in Department of Public Instruction, 1999). In other words, environmental education can raise environmental awareness, promote sustainable development, improve the capacity of people to address environment and development issues and generate effective action (Simon, 2000). In an organization of teaching and learning, the teacher can use various teaching methods to manage an environmental education depending upon the contents and learners. In this research, the researcher is interested in the Four Noble Truths (FNT) method developed by Saroj Boasri (The Institute of Culture and Arts, 2010). The method applies the Buddhist principles for instruction with systematic thinking procedures comparable to the scientific method. The FNT method has four stages: suffering, cause of suffering, cessation of suffering, the way to the cessation of suffering which emphasizes problem solving by oneself (Four Noble Truths, 2014 : website). This method can be applied to instruction for solving global warming and degradation of environments caused by human activities.

Wiriyasitaporn (2011)'s research findings on teaching and learning using the FNT method revealed that the students that learned with the FNT method had higher learning achievement prior to learning, higher learning achievement than the students that learned with the traditional learning method (Mhodsiri, 2011), higher critical thinking prior to learning (Kingkaew, 2013), and higher critical thinking than the students who used the teacher manual method to learn (Sakjirapapong, 2008).

An effective teaching and learning can develop higher-order thinking of students by giving them practical activities to do by themselves. One of the higher-order thinking which can be developed and practiced is metacognition. Metacognition is very important in building a meaningful learning by using planning, monitoring and evaluation. It is a process of learning and solving problem. Previous research findings showed that the students who learned with metacognitive techniques had higher intelligibility, plausibility and wide-applicability; could transfer knowledge and understanding about inter-lesson situations better than the students who learned without metacognitive techniques (Mittlefehldt and Grotzer, 2003). The students who used meta-cognitive techniques had more learning achievement (Appamaraka et al., 2009), more consciousness of environmental conservation and development (Sihapong. 2009), more environmental conservation behaviors (Rukkhachet. 2012), and higher critical thinking than the students using the teacher manual method (Jattuchai, 2010).

Based on related documents and research findings, the researcher is interested in comparing the effects of management of teaching and learning environmental education on global warming knowledge, global warming awareness, global warming decreasing behaviors, as well as critical thinking of grade 11 students, using the FNT method with meta-cognitive techniques and traditional teaching method.

Meta-cognitive techniques

The inquiry here is formed by three categories of metacognitive techniques for teaching, adapted from Beeth (1989a). These categories are meant to help students use metacognition in order to develop their critical thinking. The first category is intelligibility which encompasses how students reflect abstractly on the content of their thinking. That is, when students ask themselves, "Does this make sense to me?" It is useful because it gives students a conceptual foundation to activate their metacognitive processes. When assessing the intelligibility of a new idea, students may reflect on other students' ideas, or the teachers' ideas. They may ask themselves, "How does the way that this person thinks about the idea help me make sense of it?"

The second category "plausibility" enables students to test their faith in a particular idea. It is the realm in which students negotiate the status of their ideas. It encompasses the type of metacognition that occurs when students ask themselves, "Should I really believe this idea?" When testing the plausibility of an idea, students may seek

counter-evidence against an idea. As a result, the students are often very self-aware of their learning and skeptical of ideas that they only partially understand.

The third category is "wide-applicability". Employing this technique, students apply what they know about their thinking from one context to another. It involves connection making and looks at the role of reflection through experience. Students may ask themselves, "How can this concept help me in other areas of my learning? Or "What experience (in class or outside of class) have I had that would help me to make sense of this idea?" ''Wide-applicability" is the metacognitive tool that a student might use to transfer his/her knowledge, belief, or thinking from one context to another. It is an important category of transfer.

The metacognitive techniques could work both on intra-personal as well as interpersonal level, as shown in Table 1 (Mittlefehldt and Grotzer, 2003).

The research objectives

1. To study and compare the knowledge, awareness, global warming decreasing behaviors, and critical thinking before and after learning using the Four Noble Truths method with metacognitive techniques of grade 11 student as a whole and as classified according to prior biology outcome and learning model.
2. To study and compare knowledge, awareness, global warming decreasing behavior and critical thinking of the students with different prior biology learning outcomes and learning models, after learning.

RESEARCH METHODOLOGY

Population and sample

The population consists of two hundred and fifteen grade 11 students from six classes with heterogeneous ability, in the second semester of the 2013 academic year. They attend Nadoon Prachasan School under the Office of Secondary Education Service Area, Zone 26 in Nadoon sub-district, Nadoon District, Maha Sarakam Province, Thailand.

The sample consists of eighty grade 11 students from two classes (forty students each), in the second semester of the academic year 2013. They attend Nadoon Prachasan School. They were selected with cluster random sampling techniques; a class was used as a sampling unit.

Study variables

Independent valuables

They include the learning model with two methods: the FNT with metacognitive techniques and the traditional teaching method, as well as the prior biology learning outcome, which consists of high Biology achievers (T-score ≥ 50) and low Biology achievers (T-score < 50).

Dependent variables

They consist of knowledge, awareness, global warming decreasing behavior, and critical thinking.

Instrument

The instruments used for the study include lesson plans, a test on global warming knowledge, questionnaire on global warming awareness, questionnaire on global warming decreasing behavior, and critical thinking test. Detailed information about the instruments is given as follows.

Lesson plans on environmental education entitled, *Global warming* entail using the FNT method with three metacognitive techniques (intelligibility, plausibility, and wide-applicability) for the experimental group students and the traditional teaching method for the control group students; they are 5 plans consisting of 3 h learning in a week.

With respect to the development of the FNT lesson plans, some metacognitive techniques or questions were added to each stage of the method; for instance, adding intelligibility and plausibility to the first stage, adding intelligibility, plausibility and wide-applicability to the fourth stage.

The researcher constructed a multiple-choice test on global warming with 40 items: difficulties (p) ranged between 0.21 and 0.79, discriminating values (r) between 0.20 and 0.61, and a reliability of 0.913.

The rating-scale questionnaire on global warming awareness has 30 items: discriminating values ranged between 0.29 and 0.72, and a reliability of 0.927.

The rating-scale questionnaire on global warming decreasing behavior has 30 items: discriminating values ranged between 0.21 and 0.66, and a reliability of 0.918.

The critical thinking test based on the Cornell Critical Thinking level X, constructed by Ennis and Millman (1985), has 4 alternatives and 40 items. The test contained 4 areas: credibility of sources and observations, deduction, induction, and assumption identification, with discriminating values ranging between 0.21 and 0.50 and a reliability of 0.831.

Data collection

There are three stages of data collection as follows.

Preparation

The two selected classes of grade 11 students were randomly assigned to experimental and control groups. Each group of the students was divided into high Biology achievers and low Biology achievers based on the T-score.

Teaching and learning

The global warming knowledge test, questionnaire on global warming awareness, questionnaire on global warming decreasing behavior and critical thinking test were administered to the two groups of students prior to the start of the teaching and learning period. The two groups were taught by the researcher who used the 5 assigned lesson plans for three weeks, 3 h each.

Table 1. Metacognitive techniques: context and characteristic questions.

Metacognitive techniques	Context	Characteristic questions
Intelligibility	Intra-personal	Does this idea make sense to me ? What part of this idea make sense to me? What do I find difficult about this idea?
	Interpersonal	What part of Jany's model makes sense to me? What might I add to have it make sense to me?
Plausibility	Intra-personal	Should I believe this idea? Does this idea seem likely to be true?
	Interpersonal	Should I believe this Jany's model? Even if it makes sense to me; is there something about it that seems unlikely to be true? What is believable about it?
Wide-applicability	Intra-personal	How can this idea help me in other areas of my learning? Are pieces of this ideas that relate to other ideas I learned about? What are the fundamental ways in which they relate?
	Interpersonal	How does Jany's model help me think about other ideas we've talked about?

Evaluation

After the end of the teaching and learning activities, the two groups were tested by using the 3 pretest instruments as an immediate posttest. Only the questionnaire on global warming decreasing behaviors was administered to the two groups in a four-week period after the termination of the learning as a delayed posttest.

Data analysis

All of the collected data from the pretest and posttest instruments were analyzed as follows.

The pretest and posttest scores of the four instruments were analyzed to test assumptions of the Two-way MANCOVA and ANCOVA in terms of normality, correlation of dependent variables, homogeneity of variance, homogeneity of regression slope, and homogeneity of variance-covariance matrices. The tested results confirmed the assumptions at the .05 level of significance.

The scores from 5.1 were tested for the difference between the pretest and posttest measures using the paired t-test according to the whole students, the high Biology achievers and the low Biology achievers of each group.

The posttest scores from 5.1 were analyzed for testing the hypothesis that the students with different prior biology outcomes and learning models had different knowledge, awareness, behavior, and critical thinking, using the F-test (Two-way MANCOVA and ANCOVA).

FINDINGS

The research findings are presented as follows.

1) The whole students, the high Biology achievers and the low Biology achievers in the experimental and control groups had higher global warming knowledge, global warming awareness, global warming decreasing behavior and critical thinking prior to learning (p<.001).
2) The high Biology achievers had more global warming awareness generally and in two areas (awareness of global warming impact and global warming prevention);

higher global warming decreasing behavior generally and in five areas; and higher critical thinking generally and in three areas, except for assumption identification than the low Biology achievers (p≤.007) (Tables 2-5). However, the two groups did not have global warming knowledge differently.
3) The experimental group students had more global warming knowledge, global warming awareness generally and in one area; higher global warming decreasing behavior generally and in an area; and higher critical thinking in three aspects, except for the deduction aspect, than the control group students (p≤.002) (Tables 2-5).
4) Statistical interactions between prior Biology learning outcome with learning model and global warming awareness generally and in two aspects: cause of global warming and global warming prevention; global warming decreasing behavior generally and in four aspects: except for the travel behavior aspect; and an entire critical thinking were found to be significant (p≤.039) (Tables 2-5).

DISCUSSION

This study illustrates the positive influences of the FNT method with metacognitive techniques on knowledge, awareness, behavior and critical thinking of the students. Some discussions are presented in details as follows.

Firstly, the students who learned with the FNT method with metacognitive techniques had higher gains in their four learning outcomes prior to learning; this is supported by research findings of Wiriyasitaporn (1991) that the students who learned using the FNT method had more learning achievement and critical thinking (Bowonchakpop, 2011) prior to learning. This might be due to the fact that FNT method is one of the learner-centered learning experiences which provide opportunities for students to learn by doing and thinking and participating in learning

Table 2. Comparison of global warming knowledge, global warming awareness, global warming decreasing behavior and critical thinking of grade 11 students with different prior biology learning outcomes and learning models (Two-way MANCOVA).

Source of variance	Statistical test	F	Hypothesis df	Error df	p	Partial Eta squared
Pretest knowledge	Wilks' Lambda	3.558	4.000	69.000	.011*	.171
Pretest awareness	Wilks' Lambda	3.855	4.000	69.000	.007*	.183
Pretest behavior	Wilks' Lambda	1.662	4.000	69.000	.169	.088
Pretest critical thinking	Wilks' Lambda	3.187	4.000	69.000	.018*	.156
Biology learning outcome	Wilks' Lambda	20.084	4.000	69.000	<.001*	.538
Learning model	Wilks' Lambda	66.709	4.000	69.000	<.001*	.795
Interaction	Wilks' Lambda	4.107	4.000	69.000	.005*	.192

*significant at the .05 level.

Table 3. Comparison of global warming awareness in each aspect of grade 11 students with different prior biology learning outcomes and learning models(Two-way   ANCOVA).

Awareness	Source of variance	SS	df	MS	F	P	Partial Eta Squared
	Pretest	5.751	1	5.751	46.964	.000*	.385
Causes of	Learning outcome	.121	1	.121	.987	.324	.013
global	Learning model	1.996	1	1.996	16.296	<.001*	.178
warming	Interaction	.539	1	.539	4.406	.039*	.055
	Error	9.184	75	9.184			
	Pretest	.060	1	.060	.603	.440	.008
Impact of	Learning outcome	1.040	1	1.040	10.405	.002*	.122
global	Learning model	9.374	1	9.374	93.756	<.001*	.556
warming	Interaction	.008	1	.008	.079	.779	.001
	Error	7.499	75	.100			
	Pretest	3.550	1	3.550	30.706	.000*	.290
Global	Learning outcome	3.824	1	3.824	33.069	<.001*	.306
warming	Learning model	16.003	1	16.003	138.401	<.001*	.649
prevention	Interaction	3.691	1	3.691	31.923	<.001*	.299
	Error	8.672	75	.116			

*significant at the .05 level.

activities through four stages: suffering (setting problem), cause of suffering (formulating hypothesis), cessation of suffering (experimenting/collecting data), and the way leading to cessation of suffering (discussing/concluding). The students received direct experiences from doing by themselves through searching data, processing data, drawing conclusion and using their own learning method. This is supported by the Bruner's learning theory that emphasizes learning from experience or doing and reasoning (thinking) (Bruner, 1966). In addition, the students made use of the metacognitive techniques (intelligibility, plausibility, and wide-applicability), which facilitate the construction of knowledge or idea of the students and group member during a   small group working session (a type of co-operative learning) (Johnson and Johnson, 1991). The students, therefore, could collaboratively think and conclude on the knowledge gained from learning, which is supported by the social constructivist views (Suksringarm, 2007). The students had adequate knowledge which facilitated awareness and finally led to changes in behavior (Schwartz, 1974).

Secondly, the high Biology achievers had more global warming awareness generally and in two aspects (awareness of global warming impacts and global warming prevention (Table 3); global warming decreasing behavior generally and in all five aspects (Table 4) and the critical thinking generally and in three aspects, except

Table 4. Comparison of global warming decreasing behavior in each aspect of grade 11 students with different prior biology learning outcomes and learning models (Two-way ANCOVA).

Behavior	Source of variance	SS	df	MS	F	P	Partial Eta Squared
Consumption behavior	Pretest	.031	1	.031	.178	.674	.002
	Learning outcome	1.148	1	1.148	6.569	.012*	.081
	Learning model	3.373	1	3.373	19.304	.001*	.205
	Interaction	.967	1	.967	5.533	.012*	.069
	Error	13.106	75	.175			
Energy conservation behavior	Pretest	1.557	1	1.557	5.011	.028*	.-63
	Learning outcome	4.072	1	4.072	13.101	.001*	.149
	Learning model	4.772	1	4.772	15.352	.001*	.170
	Interaction	3.824	1	3.824	12.301	.001*	.141
	Error	23.312	75	.311			
Waste disposal behavior	Pretest	.918	1	918	6.204	.015*	.076
	Learning outcome	2.566	1	2.566	29.087	.001*	.279
	Learning model	3.476	1	3.476	20.986	.001*	.219
	Interaction	.524	1	.524	5.063	.027*	.063
	Error	9.566	75	.128			
Travel behavior	Pretest	.832	1	.832	2.649	.108	.036
	Learning outcome	1.562	1	1.562	4.974	.029*	.065
	Learning model	4.002	1	4.002	12.747	.001*	.161
	Interaction	8.60	1	8.60	2.738	.102	.039
	Error	23.549	75	.134			
Global warming and supporting behavior	Pretest	2.100	1	2.100	4.451	.038*	.056
	Learning outcome	5.319	1	5.319	10.765	.002*	.126
	Learning model	5.886	1	5.886	11.914	.001*	.137
	Interaction	4.091	1	4.091	8.281	.005*	.099
	Error	37.005	75	.494			

*significant at the .05 level.

for assumption identification (Table 5) than the low Biology achievers. This might be due to the high confidence of the high Biology achievers in their abilities to learn (Jokobson, 2006), being more self-directed learning behavior (Heins, 1980), and having more achievement motivation than the low Biology achievers. These characteristics could help the high Biology achievers respond to each learning activity at a more frequent level. They could develop more awareness, which led to change in the global warming decreasing behavior. Also, all experiences they received from this type of teaching and learning might facilitate the development of their critical thinking abilities.

Finally, the students who learned using the FNT method with metacognitive techniques or meatacognition-typed questions had more knowledge, awareness in general and each aspect, global warming decreasing

behavior generally and in an aspect and critical thinking generally and in three aspects, except for the deduction aspect more than the students who learned using the traditional teaching method. This is supported by some research findings that the students who learned using the FNT method had more learning achievement (Mhodsiri, 2013), and critical thinking (Sakjirapapong, 2008) than the students who learned using the traditional teaching method. This might be due to the fact that FNT method with metacognitive techniques is a type of learner-centered activity, which emphasizes learning by experience and thinking, based on Bruner's view (Bruner, 1966). The students also employed the metacognitive techniques to monitor themselves in accomplishing their learning and developing their critical thinking abilities. Furthermore, a small learning and discussion group can help their co-operative learning and construct a

Table 5. Comparison of critical thinking in each aspect of grade 11 students with different prior biology learning outcomes and learning models (Two-way ANCOVA).

Critical thinking	Source of variance	SS	df	MS	F	P	Partial Eta Squared
Credibility of sources and observations	Pretest	8.216	1	8.216	5.814	.018*	.072
	Learning outcome	20.860	1	20.860	14.762	<.001*	.164
	Learning model	92.156	1	92.156	65.214	<.001*	.465
	Interaction	5.142	1	5.142	3.638	.060	.046
	Error	105.985	75				
Deduction	Pretest	35.938	1	35.938	26.562	.001*	.262
	Learning outcome	21.922	1	21.922	16.202	.001*	.178
	Learning model	.006	1	.006	.004	.948	.000
	Interaction	.794	1	.794	.587	.448	.008
	Error	101.474	75	1.353			
Induction	Pretest	2.811	1	2.811	1.409	.239	.018
	Learning outcome	11.159	1	11.159	5.594	.012*	.069
	Learning model	42.527	1	42.527	21.318	.001*	.221
	Interaction	3.643	1	3.643	1.826	.181	.024
	Error	149.619	75	1.995			
Assumption identification	Pretest	12.017	1	12.017	8.298	.005*	.100
	Learning outcome	1.905	1	1.905	1.218	.273	.016
	Learning model	114.613	1	114.61	73.316	.001*	.494
	Interaction	.916	1	3	.586	.446	.008
	Error	117.247	75	.916			

*significant at the .05 level.

knowledge group, based on the social constructivist view (Suksringarm, 2007). The students with more knowledge of global warming might have an adequate awareness leading to global warming decreasing behavior (Schwartz, 1974) more than those students who learned using the traditional teaching method.

RECOMMENDATION

The Four Noble Truths method with metacognitive techniques is an effective teaching and learning method for enhancing knowledge, awareness, global warming decreasing behavior and critical thinking of the students. This method is based on learner-centered activities and the view of learning by experience and thinking, the social constructivist view and intellectual procedures of metacognitive techniques. The teachers, therefore, should be encouraged and supported to implement this method in teaching environmental education at any grade level.

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

A daunting task for pre-service mathematics teachers: Developing students' mathematical thinking

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The purpose of this study was to examine pre-service teachers' teaching practice in terms of providing suitable conditions for developing students' mathematical thinking in the frame of the Advancing Children's Thinking framework. In the study, Advancing Children's Thinking framework developed by Fraivillig et al. was adopted as theoretical framework. Case study was used and participants were determined as four pre-service mathematics teachers. Four lessons for each participant were observed via video camera. The data were analyzed by using descriptive analysis technique within framework components. It was found that pre-service mathematics teachers often elicited students' mathematical thinking but less often supported and extended. Although they had some theoretical knowledge about the mathematical thinking, they reflected this knowledge in practice for the first time. In this sense, it can be said that the pre-service teachers made important efforts in the development of the mathematical thinking and tried to realize a suitable instruction in the context of the framework.

Key words: Mathematical thinking, teaching, pre-service mathematics teacher, developing mathematical thinking.

INTRODUCTION

Mathematical thinking (MT) is considered one of the most important targets in mathematics education. Various definitions of MT have been put forward by different researchers. For example, Liu and Niess (2006) define MT as a combination of complicated processes involving guessing, induction, deduction, specification, generalization, analogy, reasoning, and verification. According to Mason et al. (2010) MT is a dynamic process which, by enabling us to increase the complexity of ideas we can handle, expands our understanding. Wilson (1993) states that MT involves using mathematically rich thinking skills

to understand ideas, discover relationships among the ideas, draw or support conditions about the ideas and their relationships and solve problems involving the ideas (cited in Lutfiyya, 1998, p. 55-56). By considering these definitions, MT can be defined as a dynamic process that expands our understanding and involves using mathematically rich thinking skills such as guessing, induction, deduction, specification, generalization, analogy, reasoning, and verification. Burton (1984) claims that MT is not thinking about the subject matter of mathematics but a style of thinking that is a function of particular

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operations, processes, and dynamics that are recognizably mathematical. Therefore, it can be said that MT is a skill that an (any) individual, not only mathematicians, should gain.

MT is one of the basic skills emphasized by standards and programs developed for mathematics learning and teaching. The National Council of Teachers of Mathematics (NCTM) (2000) states that, just as the level of mathematics needed for intelligent citizenship has increased dramatically, so too has the level of MT and problem solving needed in the workplace and in professional areas ranging from health care to graphic design. This change has also taken place in the objectives of mathematics education in the mathematics curriculum in Turkey.

In 2005, a radical change was made in the Mathematics Curriculum in our country. A change towards a modern approach from the traditional approach was implemented in the program. In 2011, the program was revised considering the problems in practice. MT has been incorporated into the skills targeted to be developed by this curriculum (Ministry of National Education [MNE], 2005, 2011).

It is stated that the activities teachers bring to practice in the classroom within the framework of the mathematical instruction program must be towards students' gaining high level MT skills, such as analyzing, synthesising, assessment, connection, classification, generalization and deduction (MNE, 2005). Moreover, the statement in the MNE (2011) mathematics course instruction program goals "*MT, problem solving, association, being able to use mathematics as a language of communication and modeling skills are the basic elements of learning and doing mathematics.*" shows the emphasis on MT in the program.

Besides, focusing on the importance of MT; according to NCTM (2000), effective teaching includes observing the students, listening to their ideas and explanations carefully, having mathematical goals, and using this knowledge when taking instructional decisions. Teachers using these applications motivate the students to engage them in MT and reasoning and provide learning opportunities that challenge students at all levels of understanding (NCTM, 2000, p. 19).

Even and Tirosh (2008, p. 219) report that *"It is widely accepted today that teachers should be aware of and knowledgeable about students' mathematical learning. It is believed that such awareness and knowledge significantly contribute to various aspects of the practice of teaching."* As it is seen in the literature, understanding students' (mathematical) thinking is important, therefore it is of importance too how well teachers can do this in their teaching.

Teachers' knowledge of students' thinking

Teachers' knowledge of students' (mathematical) thinking has drawn the interest of many researchers (An et al., 2004; Ball et al., 2008; Grossman, 1990; Hill et al., 2008; Kovarik, 2008; Magnusson et al., 1999; Park and Oliver, 2008; Shulman, 1986; 1987). Shulman (1986) stated that this knowledge includes an understanding of what makes learning a specific topic easy or difficult, and the conceptions and preconceptions that students of different ages and backgrounds bring with them to those most frequently taught topics and lessons. Ball et al. (2008) defined one domain of teacher knowledge as *knowledge of content and students.* They stated that this knowledge combines knowing about students and knowing about mathematics. According to Ball et al. (2008), this domain of teacher knowledge includes anticipating what students are likely to think and what they will find confusing; predicting what students will find interesting and motivating when choosing an example; anticipating what students are likely to do with it and whether they will find it easy or hard; being able to hear and interpret students' emerging and incomplete thinking as expressed in the ways that pupils use language when assigning a task.

An et al. (2004) classified knowing students' thinking in four categories: *Addressing students' misconceptions, engaging students in math learning, promoting students' thinking mathematics, building on students' math ideas.* According to these authors, an effective teacher attends to students' MT: preparing instruction according to students' needs, delivering instruction consistent with students' levels of understanding, addressing students' misconceptions with specific strategies, engaging students in activities and problems that focus on important mathematical ideas, and providing opportunities for students to revise and extend their mathematical ideas (Kulm et al., 2001; cited in An et al., 2004, p. 148).

Hughes (2006) emphasizes that *"teachers should have knowledge of how students think about and learn specific mathematics content; including knowledge of how students acquire new mathematical content, the possible solution strategies or processes students might employ, and the likely preconceptions and misconceptions that students will have"* (Hughes, 2006, p. 3). No matter what components are dealt with, for effective teaching teachers' understanding and attending students' MT is critical. Franke and Kazemi (2001) see focusing on students' MT as a powerful mechanism for bringing pedagogy, mathematics and students understanding together. Because if teachers had knowledge of students they would use it in their instructional decision-making, so that learning would be improved (Fennema and Franke, 1992). Cooper (2009) indicates that the teacher can

arrange a more individualized education and thus increase the learning of the students by focusing on their MT. Crespo (2000) also suggests that analyzing the students' MT will help the teachers in taking more appropriate decisions and developing their practice in their classrooms.

In this context, it can be said that teachers must know the students' mathematical ideas and develop instruction within the frame of these ideas (Olkun and Toluk, 2004). Although teachers' understanding of and attending to students' MT is essential for effective teaching, they have some difficulties in using this knowledge in their teaching process (Chamberlin, 2002; Hughes, 2006). Even, Hughes (2006) stated that teachers who have this knowledge find it challenging to make use of it in the process of teaching.

Researchers put forth that the interest of pre-service teachers in the students' MT also contributes to the development of their teaching. For example, taking an interest in students' MT allows pre-service teachers to question their mathematical knowledge and learning (McLeman and Cavell 2009; Philipp, 2008). However, it has been observed that even though teachers who successfully make use of students' thinking in their teaching process are expert teachers, for beginner teachers it is seen as a daunting task (Hughes, 2006). We are of the opinion that it would be useful to make pre-service teachers practice and let them think over those practices to be successful in this challenging task before they start first year of professional teaching. This is the duty of the institutions which train the teachers.

THEORETICAL FRAMEWORK

Fraivillig et al. (1999) presented and described a pedagogical framework supporting the development of conceptual mathematical understanding of the students in their study. They synthesized Advancing Children's Thinking (ACT) framework from an in-depth analysis of observed and reported data from one skillful first grade teacher. Then this framework became a guide for the authors to make a cross-teacher analysis over five additional first grade teachers.

Cengiz et al. (2011) also used the ACT framework to build a new framework for examining whole-group discussions based on students' existing mathematical thinking. They focused on how teachers' mathematical knowledge for teaching supports them in their efforts to extend students' thinking. They examined the teaching of six experienced elementary school teachers and found that all teachers created opportunities for extending student thinking about important mathematical ideas and

solution methods during group discussions. Bobis et al. (2005) derived from ACT framework to create a professional development program in their larger Project study. They found that the teachers identified considerable personal professional growth in their knowledge of children's learning in mathematics and and an understanding of how such growth could be facilitated.

As can be seen, ACT framework was used to create new frameworks or examining/developing teachers' knowledge in the previous studies. Differently in this study, we adopted the ACT framework as the theoretical framework both to support pre-service teachers' reflection on their teaching practice and to assist the researchers organizing the data. This framework was preferred because it not only suggested that students' MT should be developed and supported but also revealed a concrete way in which the teachers could manage to do this.

The framework consists of three separable, though overlapping components. The first component of the ACT framework is Eliciting Children's Solution Methods. Fraivillig et al. (1999) describe eliciting as "the teacher's efforts to provide students with the opportunity and necessary encouragement to express their ideas about mathematics". The second component is Supporting Children's Conceptual Understanding. This component is about teacher's pedagogical decisions and treatment of elicited responses. It regards the instructional strategies that support students in carrying out solution methods. The third component of the ACT framework, Extending Children's MT, is a bit different from the first and the second component, because "*The instructional components of Eliciting and Supporting involve instructional strategies for accessing and facilitating children's thinking about solution methods with which they are already familiar*" (Fraivillig et al., 1999). The authors describe that these framework components hadn't captured methods teachers employ to challenge or extend children's thinking. The strategies for advancing children's progress through their zones of proximal development (Vygotsky, 1978), in other words, areas in which they could learn with assistance, comprise the third component of the framework (cited in Fraivillig et al., 1999, p. 160). According to the ACT Framework, the instructional strategies which must be used by the teacher for developing students' MT in a questioning classroom environment revealing the thoughts and solutions of the students are presented in Table 1.

Purpose of the study

The purpose of this study was to examine pre-service mathematics teachers' teaching practice in terms of providing suitable conditions for developing students' MT in the frame of the Advancing Children's Thinking

Table 1. Examples of instructional strategies of ACT framework (from Fravillig et al.,1999, p. 155).

Eliciting	Supporting	Extending
Facilitates students' responding	**Supports describers' thinking**	**Maintains high standards and expectations for all students**
Elicits many solution methods for one problem from the entire class	Reminds students of conceptually similar problem situations	Asks all students to attempt to solve difficult problems and to try various solution methods
Wait for and listen to students' descriptions of solution methods	Provides background knowledge	**Encourages mathematical reflection**
Encourages elaboration of students' responses	Directs group help for an individual student	Encourages students to analyze, compare, and generalize mathematical concepts
Conveys accepting attitude toward students' errors and problem solving efforts	Assists individual students in clarifying their own solution methods.	Encourages students to consider and discuss interrelationships among concepts
Promotes collaborative problem solving	**Supports listeners' thinking**	Lists all solution methods on the chalkboard to promote reflection
Orchestrates classroom discussions	Provides teacher-led instant replays.	**Goes beyond initial solution methods**
Uses students' explanation for lesson's content	Demonstrates teacher-selected solution methods without endorsing the adoption of a particular method	Pushes individual students to try alternative solution methods for one problem situation
Monitors students' levels of engagement	**Supports describers' and listeners' thinking**	Promotes use of more efficient solution methods for all students
Decides which students need opportunities to speak publicly or which methods should be discussed	Records symbolic representation of each solution method on the chalkboard	Uses students' responses, questions, and problems as core lesson
	Asks a different student to explain a peer's method	Cultivates love of challenge
	Supports individuals in private help sessions	
	Encourages the students to request assistance (Only when needed)	

framework?

Method

Case study is preferred when "how" or "why" questions are posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context (Yin, 1984, p. 13). In this study, it was searched that how four mathematics pre-service teachers tried to improve students' MT in their teaching experience. So case study was chosen from among the qualitative research methods for use in the study.

Participants

Convenience sampling was used in the determination of the participants. Participants of the study were determined as four volunteer pre-service mathematics teachers receiving education in the senior class of a faculty of education Academic grade point average (GPA) of the participants in courses regarding content knowledge (pure mathematics courses), pedagogical content knowledge (courses regarding teaching and teaching mathematics) and general academic GPA are given in Table 2. This information is given because it will be helpful for us to discuss the results of the study.

    Participants were told that their real names would be undisclosed and were asked to determine pseudonyms for themselves. Only

Aslı determined the pseudonym for herself, others stated it would not matter which pseudonym was used. So the authors decided to use the pseudonyms "Ege, Aslı, Arda and Irem".

Procedure

In the faculty of education, where this research was conducted, pre-service teachers took courses regarding teaching the field (mathematics) such as Special Teaching Methods, Instructional Technology and Material Design, Mathematical Thinking, Mathematical Modeling. The Mathematical Thinking Course was given in the last term of the teacher education program, three hours in a week. They also took two courses regarding classroom practice. In the first term of their senior class they took "School Experience". In this course they went to secondary schools and observed their mentor teachers for four hours a week. Then they came to the faculty and shared their observations. In the second term they took the course called "Teaching Practice". In the context of this course pre-service teachers went to secondary schools and at first, observe their mentor teacher for six hours a week. Then they planned and taught their lessons. Due to the big numbers of pre-service teachers going the same school, one pre-service teacher could teach his/her lesson once in a term, usually for four hours.

    This study was carried out within the frame of teaching practice within the scope of the Teaching Practice Course of pre-service teachers at an education faculty in Turkey. Ege, Arda and Irem went to an Anatolian High School and Aslı went to a Vocational

Table 2. Grade point average of pre-service mathematics teachers.

Pseudonyms (gender) GPA	Ege (male)	Aslı (female)	Arda (male)	Irem (female)
GPA of the coursesregarding content knowledge	2,48	3,23	2,80	1,78
GPA of the coursesregarding pedagogical content knowledge	3,38	3,71	3,60	3,71
General academic GPA	2,82	3,44	3,06	2,49

High School as training schools. Students aged between 14 and 17 study at these schools. There are different types of schools for this age group in Turkey. In order to gain entry to these schools, students must pass the entry examinations. The type of high school students enter is based on the scores they receive from the nationwide common exam by the Ministry of Education and schools they prefer. School types are (from high to low according to scores) science high schools, social sciences high schools, Anatolian high schools and vocational high schools. At the beginning of the study, individually semi-structured interviews were performed with pre-service teachers about MT and mathematics teaching. Subsequently, participants and two of the researchers came together and discussed the answers given by pre-service teachers to the interview questions.

The purpose of this discussion was to support the pre-service teachers in terms of theoretical knowledge about MT and to reach consensus how to develop it while teaching. Then two exemplary videos of math classes were watched and participants were asked to evaluate these lessons in the context of MT.

The purpose of this group meeting was to provide participants with a consensus on MT and its importance for math education. Later on, a section of the studies about MT was presented to the pre-service teachers. In this scope, the ACT Framework was also presented to them. Following that, pre-service teachers were asked to prepare a lesson plan (4 h lessons) that developed students' MT. Each pre-service teacher examined his/her plan by meeting with a researcher when he/she prepared the lesson plan, and made some changes in line with the feedback. Then, pre-service teachers performed the lessons they prepared at their training schools. These four lessons were observed by using a video camera. These four hours were not one piece. Mathematics lessons are usually taught for two hours or one hour in a day in Turkey. So the observed four lessons were as 2+2 or 2+1+1. After they had completed their teaching, a researcher watched the videos and re-interviewed the pre-service teachers and asked them to evaluate their performance.

The focus of this study was observations of the pre-service mathematics teachers' teaching practice. Ege carried out the instruction of Conics in the 11th class at an Anatolian High School. Aslı performed the topic of Inverse Trigonometric Functions in 10th class at a Vocational High School. Arda taught matrices in an 11th grade class in an Anatolian High School. Irem, taught the subject of Trigonometric Functions in a 10th grade in an Anatolian High School.

Data sources

Data of the research were collected by means of observations. Four lessons taught by each of the participants were observed via a

video camera.

Data analysis

Data obtained from observations were analyzed by using the descriptive analysis technique in the frame of the ACT Framework developed by Fraivillig et al. (1999). Firstly, we watched the lessons individually and took notes in accordance with the framework, then came together to discuss coding and reached a consensus. We have assessed the courses separately for three components of the ACT framework and examined each component in terms of their sub-components. When required, we presented some sections of the dialogues and screen quotations.

Validity and reliability

In this research, even though we only focused on the observations, collecting data by using interviews and observations provided data triangulation as well as evidence for the validity of the research. The observations were directly conducted by one of the researchers to create a valid and reliable class environment. In the results section, direct quotations were also given to present evidence for the reliability of the research.

RESULTS

Pre-service teachers' teaching practice in the frame of developing students' MT

In this section, results were presented case by case in the scope of framework components.

Case of Ege

Eliciting the solutions of the students

Generally, reaching only one solution for one question was sufficient for Ege. So he did not reveal different solutions during his instruction; he did not elicit many solution methods for one problem from the entire class. When Ege asked the students questions or asked a student to come to the blackboard, he gave the student a

sufficient amount of time to explain his/her thought or solution and listened to them. He waited for and listened to students descriptions. However, when the student could not explain a particular point he directly explained what to do. Furthermore, he sometimes helped students who had difficulty in determining the type of cone by indicating the graphic of the cone with his hand. Also, he did not support the students in explaining their thoughts in detail and did not attempt to elicit further explanations from them. He did not question the answers by asking why or how, and focused only on the correct answer. A part of the instruction of Ege for this situation is as follows:

Ege: I drew two cones; they are symmetrical according to this point. Right cone, its base is circle. If we intersect it with a plane like this (*shows by hand*), what can we obtain? What kind of shapes?
   Student 1: Triangle
   Ege: Triangle?
   Student 1: Can't we obtain a triangle?
   Student 2: Ellipse is obtained.
   Student 1: Ellipse, sorry, ellipse is obtained.
   Student 3: Circle

Ege: Circle, we obtain a circle of the simplest form. Now I'll intersect this with a plane. If I intersect it with a plane parallel with the circle on that base (*drawing*), of course our drawings are not that good, we were relying on the projection, but we'll continue anyway, I'll obtain a circle. If I intersect it in a manner parallel to the base, again, likewise, I'll obtain a circle since I have a circle at the base. Only its radius will be smaller. What else? This is a parallel intersection. What if I intersect it with a little slope?

   Student 2: Semi thing... ellipse
   Student 4: Trapezoid.
   Ege: Let's extend it like this, guys (*draws an inclined planed intersecting the conic*). This time, it becomes an ellipse guys, even if we do not see it visually. Something like that will occur (*drawing an ellipse*). The first one, the previous one was like that (*drawing a circle*) this also seemed like an ellipse anyway but I tried to draw a circle below. The first one is a circle and the second one is an ellipse. It is somewhat elliptical, only a little more oblate than the circle.

In this dialogue, it is seen that Ege did not question student answers that were wrong, such as triangle and trapezoid, and continued his lesson by considering correct answers like circle and ellipse. It can be said Ege did not encourage students to elaborate on their responses. Ege gave responses to student questions with alternative explanations during his lessons. He continued his explanations until clearing the confusion in the minds of the students. However, he did not support the students in reaching the correct answer on their own. This situation can be considered as an indicator of an accepting attitude toward students' errors and problem solving efforts in eliciting the component of the ACT. Furthermore, Ege exhibited an approach supporting the collaborative problem solving in his teaching. However, he conducted only one group work session during his four lessons. He allowed the students to work in groups consisting of three and four persons by distributing work sheets containing the questions and some graphics provided for the solution.

He started exercising this group work to allow the class to question whether the cones have common characteristics. However, no relation could be established with this purpose in the examination phase of the questions. Ege used student explanations for the content of the lesson and continued the lessons by focusing on the comments of those who gave a correct answer. Ege did not determine the participation levels of the students. When a question was asked or a wrong answer was given to the question, he did not orientate the students towards thinking about the question or the thought. He preferred giving the correct answer himself. This also prevented the entire classroom from engaging in the lesson.

Therefore he did not monitor students' levels of engagement. He also tried to bring different students to the blackboard; however, since the students did not volunteer, he conducted his lessons with actively and voluntarily participating students. Ege was not successful in deciding which students need opportunities to speak publicly or which methods should be discussed.

Supporting the students' conceptual understanding

Ege was content with showing only one solution to the questions he solved or he wanted students to solve during his instruction. He did not make any comments about whether different solutions existed. That is to say, he did not induce students to perceive that there may be different solutions. He did not ask whether anyone had a different solution either. Ege made instant replays on points needed by students during his lessons. The information he highlighted most frequently was the determination of the type of cone according to the value of the eccentricity. An exemplar video part for this situation is below:

Ege dictates a question to the students. The student cleaning the blackboard notes the data given in the question on the blackboard: "*Please determine the type*

of cone with focus F (-3, 2), directrix 3x-2y-6=0, and passing through point P (0,6)." The student draws a coordinate axis on the blackboard. Ege again summarizes the data given in the question and directs the question to the classroom.

Ege: Just remember, how do we determine the type of conicity?

Student: Now it has a focus, it has a directrix, so this is an ellipse.

Ege: You can't know. It may be hyperbola, parabola. As you see, during the previous lesson, it is the most important one of the section we've seen until now.

Another student: You see, we were telling it by looking at "e (eccentricity)".

Ege: We were looking at the eccentricity. What was the eccentricity? It was the proportion of the distances from the focus and from the line of the point.

This part is an example of the evidence of the fact that Ege highlights previous knowledge with instant replays as well as the approach of non-consideration of student's wrong answer and not helping the student in explaining his/her individual thought indicated by eliciting component. It cannot be said that he encouraged the students a lot to ask for help when they needed it. He monitored student progress only by using questions such as "*Do you understand?*" and also gave answers to individually asked questions. A comfortable environment could not be created for the students in terms of asking whether they understood it or not.

Extending the students' MT

When Ege's instruction was analyzed within the frame of the ACT, positive findings could not be obtained for instructional components at extending level; because Ege did not ask students different and challenging problems and did not encourage them to think from different aspects during his lessons. He did not give students the opportunity to analyze, compare or generalize mathematical concepts. He played an active role in reaching the general equations of cones, making comparisons between conic types, but did not ensure the participation of the students. He asked questions such as "*What is a circle?*", "*What is a geometric locus?*" in the first lesson to establish relations between the concepts; however, when he could not get an answer, he made the definition of geometric locus, circle, and line without changing tack. Subsequently, he went on to talk about cones and explained that the circle and the line are also a cone. He tried to correlate the concepts of ellipse and circle. However, here again he explained the relation without compelling students to think.

Case of Aslı

Eliciting the solutions of the students

In her lessons Aslı did not give the solution herself when studying on a question or a problem and wanted students to share their solutions. She tried to elicit different solutions for one problem from the entire class by means of questions such as "Who solved it in a different way?", "Did anyone do it differently?" She asked if there were different solutions to the solution of the student she brought to the blackboard, and if any, she wanted the students to share them. For example, after having examined if the function f: $\mathcal{R} \rightarrow$[-1, 1], f(x) = sinx whose graphic was given in her first activity is a bijection, she moved on to the question "*Is there any interval where this function is bijective? If any, please show it*". The student she brought to the blackboard wrote: $[0, \pi] \rightarrow [-1,1]$.

Student 1: Is it right, teacher?

Aslı: If you thought something different, come and write that, too.

Student 2: Teacher, my friend has also done it as $[\frac{\pi}{2}, \pi]$.

Student 1: $\frac{\pi}{2}$ is also there, teacher.

Aslı: Okay. You come and write it too, let's have a look and see if it's correct.

Student 1: No teacher, no need if it's correct.

Student 2: Please tell me teacher, is it correct?

Aslı: Guys, if you're making another interval, let's talk about that, too. For example, did you say $[\frac{\pi}{2}, \pi]$?

Aslı wanted the students to explain the solution, waited for and listened to them. She always questioned the answers given by the students and expected detailed explanations from them. So she could encourage the students to elaborate on their responses. She asked questions such as "*Why yes?*" or "*Why no?*" to the students giving yes/no answers. She did not directly say correct or wrong in response to students' answers and appreciated all of the opinions. Thus she was able to determine what the students thought and to take measures against possible mistakes. She listened to the explanations of the students giving wrong or irrelevant answers and made remedial explanations to eliminate the existing difficulty. She provided a comfortable classroom environment for the students so that students could ask about points they did not understand without hesitation with questions such as "*Has anyone had any difficulties so far?*", "*Is there a point you haven't understood?*" Aslı's approach also showed that she has an understanding attitude towards student mistakes. She conveyed an accepting attitude toward students' errors and problem solving efforts. During her lessons, Aslı motivated the

students in a collaborative working environment with four activities and one worksheet. During this process, she continuously walked between the desks. She took care of almost all of the groups, answered the questions, and guided the groups in reaching solutions. Questions included in the activities focused not only on the operational skills of the students but also their conceptual knowledge. She shaped her lessons according to the approaches of the students and used students' explanations for the content of the lesson. Aslı tried to engage the students in the lesson by using expressions such as "*Look at the blackboard, did you do it like that?*", "*Are you thinking as your friend thinks?*" So she could monitor students' levels of engagement. She was careful to bring different students to the blackboard to show the solutions or explain their opinions so that every student had the chance to speak.

Supporting the students' conceptual understanding

In her lessons, Aslı lead students to establish interrelations in the definition of inverse functions of sine, cosine, tangent, and cotangent functions and reminded them of conceptually similar aspects. For example, she expected from the students to learn arcsine function to write x = arccosine y if y = cosine x for arccosine function. She called a student to the blackboard. The student wrote y^{-1} under y = cosine x expression, and then arccosine and then arccosine y after a warning from Aslı. When the student got stuck on this section, the class shouted out $f^{-1}(x)$ to help them. Then the student wrote arccosine y = -x. Meanwhile Aslı made the following explanation by noticing that the student was experiencing difficulty: "*What's going on guys? (The student) she changed its place. What were we doing while writing the definition and the range sets? What did we do while writing its inverse? We've changed the place of the function. We're also changing the place while writing these.*" Aslı reminded the students of previous (background) knowledge when necessary. For example, at the beginning of the lesson she started a classroom discussion about what conditions must be satisfied so that inverse of function can exist. And then, she found it necessary to remind them what the function was. However, in the 4th lesson, she created a discussion environment about how the factorization while transitioning to sum and difference formulas can be used in trigonometry.

Also, since the students could not continue to study because they could not remember the Sine Theorem in the 4th activity, she reminded them of the Sine Theorem by calling a student to the blackboard and guiding the student. She helped each student in the explanation of individual solutions in the discussion of the activities by the classroom. She also made instant replays in line with the explanations or questions of the students. Aslı did not adhere to only one solution and expressed that she's open to different solutions during her instruction.

She showed her own solution where students experienced difficulty. She ensured that all of the students see the different answers she got verbally from the students by noting them on the blackboard. She frequently asked whether there is any point that is not understood and encouraged the students to ask for help when they needed.

Extending the Students' MT

It was observed that Aslı confronted her students with questions that might be different for them and of a type they are not accustomed to in the activities. In this sense, the questions were challenging for her students. Aslı asked each student to solve these questions. She supported the students in trying ways that might compel them individually. She took the answers and the solutions of the students to be the center of the lessons and guided her lessons in this direction. She encouraged the students to analyze the concepts, to make comparisons, and to generalize during her instruction. At the same time, she supported the students in establishing relations between the concepts. For example, she tried to enable the students to reach the sum formula for the sine function in her 4th activity.

Here she asked the students to find the area of OAB, OAP, and OBP triangles with the help of the Sine Theorem and to show the relation between these areas. Thus, a formula for sine (α+β) was obtained together with the students (Figure 1).

Case of Arda

Eliciting the Solutions of the Students

Arda shared multiple ways of reaching a solution to a problem in the classroom. He supported students' different ways of reaching a solution. For instance, in finding a determinant of a matrix, he demonstrated both his solution and two other students' solutions. Also, he waited for the students to explain their solutions regarding the questions they asked and he listened to them. However, he did not encourage the students to explain their responses in detail.

Arda had a tolerant approach towards students'
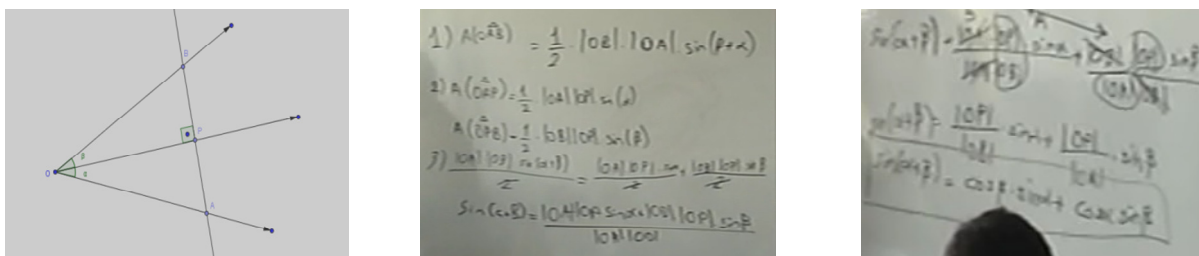
Figure 1. A figure and screen extractions from an activity performed by Aslı.

mistakes and challenges in his class. For instance, he asked the students to find inverse of the matrix in his first class.

$$\begin{bmatrix} 1 & 0 \\ -1 & 2 \end{bmatrix} \cdot \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Here, students needed to multiply the two matrices initially. At this point, Arda asked the students whether they had difficulty in the multiplication operation. When one of the students stated that he was confused, Arda said: "*Then, we'll practice solving the problem with you*".

Arda supported collaborative work in his classes. He divided the class into groups and let them do worksheets. Also, Arda shaped his class with student explanations that arose from time to time in classroom discussions he created. For instance:

Arda: In the end, the 2x2 matrix transformed the square into a rhomboid. Then, what can we name this matrix?

Student 1: A transformable matrix.

Arda: Here, is the matrix transforming or transformer?

All students replied with transformer.

Arda: Now, friends what does the C point refer to?

Student 2: Vector.

Arda: It also indicates a vector. What have we done? We rotated or pushed that vector with that matrix. Whichever was appropriate? Then, our 2x2 square matrix turned a point on the line into another point.

All through his classes, Arda tried to engage the students in the class with the question-answer technique. He let different students show their explanations or solution ways. In particular, he supported the students who were having difficulty in understanding the subject.

Supporting the students' conceptual understanding

Arda tried to remind the students of conceptually similar problems. For instance, while they were trying to work on how to find the inverseof a matrix, he asked "*How do you find inverse of 5 in multiplication?*" When students replied

with 1/5, Arda asked why they did it that way. However, without waiting for students to think and reply, he gave an explanation. "*For instance, what should we multiply by five to get the unit element. What do we need for this? 1/5. Then, here, with the same rationale, we will try to get the inverse matrix*".

Meanwhile, Arda reminded the students of previous knowledge. For example, while trying to show that determinant is a rule of function that matches the set of real numbers with the set of matrix, Arda reminded the students of the concept of function.

While performing group studies, he did not guide the individuals in the group to help each other. During his teaching, no different individual solution was offered by the students. Student solutions were generally as expected.

Arda helped the students explain their solutions. When students struggled to reach a solution, or for the purpose of reinforcing some information, he made repetitions. In finding a determinant of a matrix, although he showed two students' solutions on the board, Arda showed his own solution to the students, too. This approach is an example that Arda shows the solution he had chosen without using single method.

Arda did not ask a different student to explain his friend's solution. With some statements like "*Is there anyone who is having trouble in multiplication in matrix?*", "*Let's deal with anything you do not understand right now?*" he encouraged students to ask for help whenever they needed or whenever they had a problem.

Extending the students' MT

Unlike the traditional approach, Arda made sure the students arrived at the information themselves. In this respect, he encouraged students to analyze the concepts and make comparisons and generalizations. For instance, when Arda asked how the inverse of amatrix could be found, a student replied immediately. Arda said instead of

Mr. Ahmet is located at point T. The height of the mountain peak is 2500 m. His friend Mehmet is at Point A and his height from sea level is 1850 m. Since Mehmet at Point A looks at his friend Ahmet at a 12 degree angle, how do we find the distance between A and T?
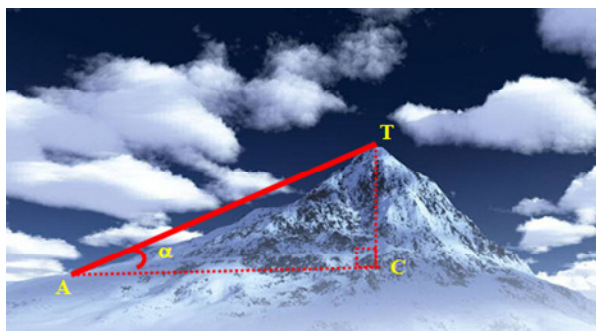
Figure 2. An activity from Irem's lesson.

providing the answer from memory, they would focus on why. Before finding the inversematrix, Arda made them work on an example. The example he gave later was about a matrix withoutthe inverse. When they saw this matrix did not have aninverse, Arda asked the students to find a general statement for any 2x2 matrix. He showed that some matrices did not have an inverse. This kind of teaching, which the students were not familiar with, was also challenging for them. In this respect, Arda's approach in classes can be regarded as a positive finding for the sub-component asking students to work on solving difficult problems and try different solution methods. Moreover, Arda made necessary studies for students to consider the relationships among the concepts. For instance, he encouraged students to notice the relationships of determinant and function concepts and matrix and transformation.

Case of Irem

Eliciting the solutions of the students

Irem could not show multiple solutions to a problem. For instance, she asked the students to find the angle she put on a mountain in one of her activities (Figure 2).

She called on of the students to the board for this activity. When the student stated that he found the tangent of the angle, Irem asked: "*Why did you find the tangent?*" The student replied: "*Because I cannot find the angle*". Irem then turned back to the classroom and said: "*Your friend found the tangent*". Although the class misunderstood that the only way to find the angle in that problem was to find the tangent, Irem moved on to another activity as soon as the student completed his solution. She did not mention the fact that the angle could have been found by some other methods. Neither did she

ask the class whether anyone had used another method.

When Irem's instruction was assessed within the ACT framework, we observed that Irem only focused on the correct answer in each component. Irem waited for and listened to students' methods of reaching a solution, but when she heard a wrong answer from a student, she moved on to a student who had the correct answer, instead of paying attention to the student answered incorrectly. She did not encourage students to explain their reasoning in detail. To illustrate, in an activity where she tried to associate trigonometric functions with daily life, Irem stated in her presentation that "*One of the basic problems of trigonometry is to define the height of an unreachable object*". And she asked how this could happen. One student replied with "*similarity*" and Irem moved on to the next slide without waiting for the student to explain his answer. In another activity, she asked why Cot 0 was undefined and the student replied, "*0 or 180*" and added that he did not understand the logic. So, Irem put the question to the class by saying "*Is there anyone who knows the logic*?" and looked for someone to reply but she did not try to draw out the students' responses. She did not provide any opportunity for the student to explain her idea and resolve the problems she encountered. Irem's approach shows that she did not have a positive approach towards students' mistakes and difficulties because, as stated above, Irem focused on the correct answers and ignored the wrong ones. She did not try to help students who made mistakes and instead she paid attention to the student who replied correctly. Thus, it can be said that Irem could not direct course content by using student explanations. For instance, Irem asked the students in the 3rd lesson: "*What does sin (-θ) refer to?*" One student responded, "*the inverse*" while another one responded, "*if we subtract θ from 360*". However Irem, ignoring these two responses, immediately gave the correct answer herself. Although in fact the student

responses provided were good ideas to reach the exact answer, Irem did not give any feedback on these responses. Thus, it can be said that Irem is not very successful in determining students' level of engagement in the course.

Irem instructed her classes by using a presentation she had previously prepared and reflected on the board making use of technology. She sometimes divided the students into groups of two and distributed activity worksheets to them. In this respect, it can be said that she tried to promote collaborative problem solving. However, Irem only moved around the groups. She did not interact with the groups and check what they were doing. Besides, Irem tried to call different students to the board but she did not make any effort to choose students who needed assistance to come to the board.

Supporting the students' conceptual understanding

While defining the trigonometric functions in the first class, Irem asked students to remind her of the concept of functions.

Irem: When doesn't function exist?

Student 1: When there is an unknown.

Student 2: When there is a number.

Irem: When there is a number. Where do we get those numbers to use this number?

Student 3: Natural numbers.

Irem: What do natural numbers define?

Student 4: Sets.

Irem: They define sets.

Irem: They define natural number sets. That is, unless there is a set, there is no function. Ok. How do we use that set in functions? We use it while defining. Is there anyone with an answer?

As seen in these dialogues, Irem tried to remind the students of previous knowledge with regards to function and set concepts. Next, she stated the definition set and value set for trigonometric functions.

Irem made use of group studies in her classes. However, within this process she did not direct the students in this group to help each other. For instance while working on an activity, one student did not understand anything from an activity and asked the teacher.

Irem: What is the expression that corresponds to length C? We have just done it, remember?

Student: Well, I'll understand after the example.

Irem: Try to do it.

At this point, Irem could have directed the other students in the group to help this student but she did not do that.

Irem did not quite assist the students in explaining their individual solutions. For instance, when one of the students said he had found a mistake in the solution his friends made, Irem said: "*Yes, we have made a mistake*" and then called the student: "*Would you like to come up, too?*" Then, she let the student who made the mistake sit down. If she had asked the student to explain his solution, maybe the student could have noticed his mistake and corrected it.

Irem did not do any necessary repetitions in her teaching. For instance, while working on an activity, one of the students asked: "*Is grad degree divided by 180*?" Irem only replied, "*What was that?*" Meanwhile, the student who asked the question learnt the answer from one of his friends and kept on working. Irem did not feel like repeating it since there was no more problem.

Extending the students' MT

When Irem's classes were examined within the framework of the ACT, positive findings could not be obtained for the extending component. In fact, the activities Irem prepared were quite proper for students to analyze the mathematical concepts, compare them and generalize. However, Irem could not manage these activities well. Her purpose in activities was always to find the correct answer. Instead of a teaching method that takes student's ideas into account through effective questioning, Irem followed a traditional approach in her classes and focused on the result not the process. Due to this approach, she did not attempt to develop students' MT.

DISCUSSION AND CONCLUSION

The purpose of this study was to examine the teaching practice of pre-service mathematics teachers in terms of providing suitable conditions for developing students' MT in the frame of the ACT Framework developed by Fraivillig et al. (1999).

In the eliciting component of the ACT Framework, Aslı put students' opinions in the center of her teaching and prompted students' to explain their reasoning/solutions. While Arda considered different solutions, he was insufficient in supporting students' explanations in their solutions or opinions. Ege and Irem focused on only the right answer in their classes. While they were putting questions to students and getting some answers, they did not try to draw out student responses or learn the source of their thoughts. In facilitating students' responding of the eliciting component, all participants conveyed an

accepting attitude toward students' errors and problem solving. This may stem from being a pre-service teacher. Because these teaching process were their initial attempts for teaching mathematics and it was an exciting experience for them. So, they could be more patient and tolerant. Within the scope of eliciting, all of the pre-service teachers encouraged cooperative problem solving. By distributing students activities and worksheets, they made students do group study. However their way of practice was different. Aslı and Arda considered it important that activities were finalized by students; listened to different students and shaped the class with students' explanations. After getting the correct answers in the activities, Ege and Irem passed onto the next step without listening to the other responses. In fact, in a group study, the teacher should not focus on the correct answers but become an observer who facilitates the interaction in the group (Baki, 2008, p. 185-186). But, Ege and Irem were not successful to achieve this.

The second component of the ACT framework was supporting.Ege, Aslı and Arda had instant replays at the necessary moments. On the other hand, Irem did not do any instant replays although she reminded the students of previous knowledge. Aslı and Arda reminded students of conceptually similar problems and tried to provide them with some clues regarding the solution of the problem. Ege, Arda and Irem were teaching in an Anatolian High School while Aslı was in a Vocational High School. Despite this (mathematics achievement is lower in Vocational schools than in others), the most comfortable classroom setting that enabled students to ask questions or explain their ideas was Aslı's classroom. Aslı encouraged her students to state their ideas even if they were wrong. In this respect, Aslı was the participant who had the best pedagogical skills in terms of encouraging students' to express themselves. Even though she was the most successful participant in ensuring the conditions for supporting component, Aslı did not direct the group to help an individual student or ask a different student to explain a peer's method. The grade point average of Aslı's students was not very good and the students were not accustomed to doing these activities in a lesson. So, these may be the reasons for her challenges. She could not assist individuals in private help sessions. The reason for this may be being a pre-service teacher and not their regular teacher. Aslı and Arda reminded students of conceptually similar problems and helped students explain their individual solutions. In contrast, Ege and Irem did not teach in this way.

The last component of the ACT framework was extending. Fraivillig et al. (1999) emphasized that in the first two components, problem solutions, which students were formerly used to, were emphasized but in the last component attempts were made to challenge students and draw out their answers. In the extending component, no findings were found in Ege's and Irem's classes because neither Ege nor Irem showed students any condition which might make students think in some other ways. Aslı and Arda ensured that there were conditions when students were challenged. They supported the students in examining mathematical concepts, making comparisons and reaching generalizations. They tried to form connections among mathematical concepts. This might be the result of the fact that Aslı and Arda had a particularly good level of content knowledge because it is seen that the average achievement level of Aslı and Arda in the pure mathematics courses they attended at university was higher than the averages of Ege and Irem. Also, considering their GPA, Aslı and Arda had higher GPA scores than the other pre-service teachers. In particular, since Aslı and Arda had good levels of content knowledge, it was observed that they knew the relationships among mathematical concepts really well in teaching towards developing mathematical thinking. We think this is why they could ask questions that might make students realize the relationships among concepts comfortably and direct their classes without hesitating on questions that might be asked by students. Due to the low academic and content knowledge achievement scores of Ege and Irem, they focused on the right answers of the students and avoided examining these correct answers or wrong ones in detail. This was mostly apparent in the third component of the ACT Framework. While Ege and Arda did nothing about this component because of their lack of knowledge, Aslı and Arda tried to get students to work on difficult problems.These findings of this study are consistent with the previous research results that emphasize the importance of the content knowledge for teaching (Ball et al., 2008; Kahan et al., 2003). As a result, it can be said that Aslı was the most skillful pre-service mathematics teacher in terms of providing suitable conditions in developing students' MT in the frame of ACT framework in her teaching. Pre-service mathematics teachers of this research often elicited students' MT but less often supported and extended. Although not all of them exhibited the same level of skills, pre-service teachers identified the current ideas of students before giving the concepts or principles and tried to construct new information on this old information. According to Fraivillig et al. (1999), learning what children know and how they think about academic concepts is a critical factor for developing children's thinking. By revealing children's responses, teachers measure children's individual thinking and arrange learning opportunities for all students (Yackel, 1995; cited in Fraivillig et al., 1999, p. 154).

Differently, Fraivillig et al. (1999) found that their participants had often supported students' MT. They determined eliciting and then using student descriptions of MT as a complex and time-consuming task requiring patience, skill and high levels of knowledge about individual children and about typical solution methods in major mathematical areas. This difference might result from the fact that the grade levels taught were different. Similar to the study by Fraivillig et al. (1999), extending was the least observed component in our study, too.

Although the participant pre-service teachers got theoretical knowledge about MT during their teacher education program, they reflected this knowledge in practice for the first time in this study. In this sense, it can be said that the pre-service teachers made significant efforts in terms of developing students' MT in their teaching and tried to realize an instruction suitable for the ACT framework. Similarly to the results of this study, Hughes (2006) also determined that ten mathematics pre-service teachers learned to deal with the MT of the students in lesson planning before and after a lesson they took. It is reported that they showed a meaningful development in terms of their skills for dealing with the MT of the students from the beginning until the end of a lesson they took at university. Similarly to the study of Hughes (2006), this study can also be performed by monitoring the teaching practice of pre-service teachers before and after the study process and comparing the results. Furthermore, handling the teaching practice of the pre-service teachers in the same concept may create different results. Another study could be carried out with teachers from different faculties, teaching the same subject topic (for example: four more teachers teaching conics). Further studies could compare the results with pre-service teachers from different faculties and also with teachers with more experience. It would be appropriate to match the topics worked by the pre-service teachers in a further study.

In conclusion, in line with the results obtained in this study, it is thought that it will be useful if pre-service teachers are informed about the ways of developing students' thinking in detail, and gain experience about reflecting the knowledge they have theoretically, and this is included in the curriculum. Furthermore, the preparation and application of the lesson plans related to how the lessons that could contribute to components of supporting and extending MT must also be included in the process by teacher education institutions.

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

Mutual investigation about study process approach of Physical Education and Sports Faculty and students of Faculty of Education

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This study was conducted to examine the differences between the study approach of students studying in Physical Education and Faculties of Education. For the study, Dumlupınar University School of Physical Education and Sports and Faculty of Education students were voluntarily participated to the study. As a data collection tool, conducted with the Turkish adaptation by Yilmaz and Orhan (2011), the studying process approach scale (SPQ) was used in the study. In the study, frequency and percentage descriptive statistical methods were used to determine the distribution of the personal information of the participants in the analysis of data obtained in the study. To determine the distribution of data, the sample Kolmogorov-Smirnov normality test and, for the identification of significant differences, the t test analysis and two way MANOVA analyses were used (p = 0.05). As a result, in the participants' study approach, in the deep approach subdimension, a significant difference was found between school of Physical Education and Sport students and Faculty of Education students. Physical Education students (3,09 +/- 0,69) have a higher average than education students (2,92 +/- 0,65). Also, it was determined that there was a significant difference in the study approach of participants based on gender (p < 0.05).

Key words: Physical education and sport, education, study approach.

INTRODUCTION

Education, is intended to access information, organise information, assess knowledge, offer information and to be equipped with communication skills. In order to implement these basic aims, the teaching-learning process should be effective and long lasting in terms of learners (Yilmaz et al., 2010).

Our age is the age of information and increasing knowledge, skills, attitudes and behaviours to be gained in learning day by day requires individuals to know effective learning (Kaya and Akçin, 2002). Students who do not know learning strategies and how to use them cannot be successful even if they afford too much and the reason of their failure might be about their capabilities or their teachers for them and they feel hard done (Açıkgöz, 2003). Researches related to the use of learning strategies and academic achievement show the

existence of a strong relationship between the use of the strategy and academic achievement and these show that students who are taught learning strategies are affected positively (Yılmaz, 2013). Gieve and Clark (2005) reveals evidence that lends support to the notion that the learning approach is likely to be influenced by many factors other than the curriculum style, including teaching quality, type of assessment and learner characteristics such as personality type, age and previous work or academic experience.

Psychologists, educators and researchers have debated for many years about the definition of learning and how it occurrs. In a changing and improving world, many definitions and arguments are presented for learning concepts as many subjects. A variety of learning approaches have seen more interest and acceptance in some time and with different topics (Temizöz and Özgün Koca, 2008).

The researchers stated that one of the factors affecting the learning of individuals is a proper and effective way of studying (Yılmaz and Orhan, 2011), and they argue that students' approaches to learning and studying are indicators of how they approach academic tasks (Topkaya et al., 2011). It is thought that students thinking of themselves as more successful have more positive studying attitudes and use more effective study strategies. Also the teacher encouraging the students to be successful individuals is thought to be effective in determinining studying lesson strategies (Yılmaz, 2013).

Making arrangements for control groups within a school or university can be difficult. Cohorts of students are commonly taught within one class, so splitting them into two or more groups requires special arrangements and extra resources. There are likely to be ethical issues as one or more groups accorded different treatments may feel disadvantaged. Taught courses normally last for extended periods such as a school year or a semester. Designing different teaching programs, arranging for the separation of groups an holding extraneous variables constant becomes more difficult to longer the trial (Kember et al. 1997).

The students approaches to learning is a research that originated in Europe and Australia with the aim of understanding how students set about the task of learning. Students approaches to learning comprise both a motive (why they learn) and a related learning strategy (what they do) are sensitive to contextual and personological factors (e.g. course perceptions, conceptions of learning) and generally influence learning outcomes (Justicia et al., 2008).

Weinstein and Mayer (1986) emphasise that the skills of learning, remembering, thinking and autonomus teaching are a necessity for students. So students may become more efficient in ordering a constantly increasing fund of knowledge, processing and making it a part of their thinking aspects. For this, students 'must learn to learn' at first. Learning how to learn requires them to learn learning strategies (Tasdemir and Tay, 2007).

Information acquired by students during school learning may remain insufficient for many reasons, particularly in rapid improvement in technology. We need to reach instantly the new information whether in working life or in daily activities. Therefore one of the most important goals of educational institutions has become to 'teach to learn' and to 'raise autonomus learners' (Altınok, 2004).

Students have to develop ways of learning appropriate to the particular subject areas they are studying and even to the purposes of specific teaching methods. Saljo (1982) also believed that conceptions were contextually specific social setting; students try to interpret what is required of them in a particular situation on the basis of past events. Traditional schooling may thus socialise youngsters into a way of thinking that is immediately challenged by university work, although often not in a sufficiently explicit manner for student to see how and when they need to change (Entwistle and Peterson, 2004).

In the study done by Abraham, Vinod, Kamath, Asha and Ramnarayan (2008), by benefiting from the studies done by Darts and Clarke (1991), Newble and Entwistle (1986), Shreemathi (2001) and Svensson (1977) and many researchers stated that defining students' learning approaches is important in terms of helping make better learners, monitoring and developing the effectiveness of the teaching of instructors, identifying students who are at risk due to ineffective strategies and observing the learning experience and outcomes (Dural, 2008; Olpak and Korucu, 2014).

Biggs (1987) claims that the identification of learning profiles based on assessment of approaches to learning are useful for identifying students styles and their compatibility with a particular learning environment. He goes on to suggest that such a profile would also be useful for identifying students with study strategies that are not congruent with academic success (Snellgrove and Slater, 2003).

Researchers have argued that in order to promote more conceptual deeper forms of learning, educators need to understand how students approach learning (Ballantine et al., 2008). Students' learning approaches are not fixed and they can exhibit different learning approaches in different situations (Önder and Beşoluk, 2010; Yılmaz & Orhan, 2011). In this context, it was aimed to investigate the study process approach of Physical Education and Sports faculty students and Faculty of Education students with different variables.

METHOD

Study group

Two-hundred   and fourteen students leading their student lives

actively in the 2013 to 2014 academic year, spring term, and studying in the Physical Education and Sports and Faculty of Education departments, participated voluntarily. Before the study, participants were informed about the content of the study and said that it was not a time limit to answer the questionnaire. Participants were assured of the results beyond the aim of the research will be used for any other purpose. Totaly 214 university student participated to the study (Male:105, Female:109, Mean of age: 21±1.61). In the study two different department were chosen because of the differences between theoretical and practical lesson numbers of students of school of Physical Education and Sport and faculty of education were enrolled in this study. These two different deparments as well as students lessons and also course numbers include some differences. The study was determined that these differences affect or not their learning levels.

Data collection tool

In the study as a data collection tool, a personal information form was prepared for determining participants' personal information distribution and study approach scale which validity and reliability were tested by Yılmaz and Orhan (2011) and developed by Biggs et al (2001) was used.

The study approach scale consists of two subscales, including a total of 22 questions and a superficial and deep approach. Cronbach's alpha internal consistency coefficient calculated for scale is 0.79 for the deep approach sub-dimension, and 0.73 for the surface approach sub-dimension.

The characteristics of a deep approach to learning: Students who take a deep approach have the intention of understanding, engaging with, operating in and valuing a subject. Such students:

• Actively seek to understand the material / subject
• Interact vigorously with the content
• Make use of evidence, inquiry and evaluation
• Take a broad view and relate ideas to one another
• Are motivated by interest
• Relate new ideas to previous knowledge
• Relate concepts to everyday experience
• Tend to read and study beyond the course requirements

What are the characteristics of a surface approach to learning?:

Students who take a surface approach tend to not have the primary intention of becoming interested in and understanding the subject, but rather their motivation tends to be that of jumping through the necessary hoops in order to acquire the mark, the grade or the qualification. When asked, staff deplore this approach but they frequently acknowledge that the majority of their students tend to take this approach. Students who take a surface approach:

• Try to learn in order to repeat what they have learned
• Memorise information needed for assessments
• Make use of rote learning
• Take a narrow view and concentrate on detail
• Fail to distinguish principles from examples
• Tend to stick closely to the course requirements
• Are motivated by fear of failure

Data collection

After making appointments with the students situated in the sample

group data was obtained between courses in block lessons and at the beginning of the non-block lessons by using the paper and pen method. The researcher did not give any information about the approach for each group during the acedemic course.

Data analysis

First, the reliability of the data collection tool for the research group and Cronbach's alpha internal consistency coefficient was calculated as 0.74 for the total scale. It stayed in the original scale due to the fact that questions on the scale did not cause an increase in Cronbach's alpha internal consistency coefficient. Then, in order to define the distribution of data, the One Sample Kolmogorov-Smirnov test was applied. Histogram graphics has also been drawn by looking at kurtois and skevness values. Accordingly, the data shows a normal distribution in both subgroups (Deep Approach: .97, Surface Approach: .92). Percent and frequency methods are used to determine the distribution of the personal information of the participants in the study. In addition, the $\alpha = 0.05$ in the significance level independent sample t test and two way Manova tests were used to determine the existing significant differences between the studying approaches of the participants. For the two way Manova analyzes made about assumption; Levene homogeneity of variance in the dimensions of the test provided that the epistemological concepts and a linear relationship between the dependent variable and each made of a pair combination of the simple correlation analysis found that among the dependent variable and showed the highest correlation (0.7) coefficients (Pallant, 2001). The considerable size of the well test value 0,001 (Pallant, 2001) shows that the scores on the dependent variable homogeneous variance-covariance matrix. In this case, the dependent variable is equal to that of covariance for equality and dependent variables of all possible binary combinations of variance for each of the groups assumed (Groves et al., 2004).

FINDINGS

Descriptive analysis

Table 1 shows the distribution of personal details of students included in the study. Accordingly, it is seen that 50.9% of the sample group were from the age group of "21 and below" (n = 109), 50.9% were "Female" (n = 109) and 50.5% (108) were from the department of "Education.". Also, it is seen that 59.3% of the students were "3rd Class".

Results of scale reliability

Table 2 presents the calculation of Cronbach's alpha for testing the reliability of the sample for the data collection method used in the study group. According to the sample group, the data collection tool was reliable.

The impact of gender and age on studying process approach

According to two-way MANOVA results; the impact of

Table 1. Distribution of the Respondents' Personal Details.

Variables		F	%
Age	21 and below	109	50,9
	22 and over	105	49,1
	Total	214	100,0
Gender	Male	105	49,1
	Female	109	50,9
	Total	214	100,0
Department	Department Of Physical Education	106	49,5
	Education	108	50,5
	Total	214	100,0
Class	1.class	23	10,7
	2.class	26	12,1
	3.class	127	59,4
	4th or extended	38	17,8
	Total	214	100,0

Table 2. Data collection tool reliability results for the sample group.

Study Process Approach Scale	
Cronbach's Alpha	Number of question
0,74	20

gender significant on studying lesson approach's two sub-dimensions ($\lambda=0,36$, $F_{(2)}=4783$, $p<.05$). Also, the effect of age significantly on studying lesson approach's ($\lambda=0,36$, $F_{(2)}=3,867$, $p<05$). When we examine partial eta squared as Wilk's lambda test results gender values effect is middle ($\eta2 =0,36$), as fora age also middle but slightly stronger than gender ($\eta2 =0,44$) . However; independent variables' of joint effect is found weak ($\eta2 =0,02$). According to the results of the analysis carried out in dimensions; While deep approach shows significant differences not only in age ($F_{(1,209)}=6,505$; $p<0,05$; $X_{(21andbelow)}=2,85+/-,64<X_{(22andover)}=3,12+/-,69$) but gender ($F_{(1,209)}=4,563$; $p<0,05$; $X_{male}=3,09+/-,68>X_{female}=2,89+/-,66$); surface approach shows significant differences only in gender ($F_{(1,209)}=7,669$; $p<0,05$; $X_{male}=3,00+/,70> X_{female}=2,76+/-,65$).

Differences of study process approach according to department

The study process approaches the dimensions of Physical Education and Sport shows a significant

difference in favour of the students ($p < 0.05$). As can be seen from the Table 4, Physical Education students (3,09 +/- 0,69) have higher average than faculty of education students (2,92 +/- 0,65) for the deep approach.

DISCUSSION AND CONCLUSION

In this study, Physical Education and Faculties of Education college students conducted to examine the differences between their study approaches. The study participants according to the analysis results of the gender based approach, also showed significant differences in both the deep and shallow sub-dimension approaches, based on experience and their profound approach to the school in which they studied showed significant differences in the dimensions. Due to the diverse student population entering universities, age and gender have become important factors in researching students' approaches to learning (Duff et al., 2004).

The research explain that issues rather than get high grades were announced as the main objectives to absorb learners using deep approach (Yılmaz and Orhan, 2011). In his study Şen (2006) found that the higher the overall increase in the use of learning and study strategies. The findings of the present research are parallel to each other. Richardson's (1995) study supports this observation. Also our study is parallel to these results. Older students have higher average than younger students. This situation may stem from experience. Students learn how to study lessons day after day.

Unlike the relationship between approaches to learning

Table 3. Two way MANOVA test results.

Multiple comparions	Value	F	sd	Error df	p	η2
Intercept	0,02	3589,38	2	209	0,00	0,97*
Gender	0,95	4,783	2	209	0,02	0,36*
Age	0,96	3,867	2	209	0,00	0,44*
Gender*Age	0,97	2,304	2	209	0,10	0,02

Table 4. Study process approach by department.

		N	Average	Standard deviation	t	p
Deep approach	Department of Physical P Education	106	3,09	0,69	2,25	0,02
	Education	108	2,88	0,65		
Surface approach	Department of Physical Education	106	2,92	0,65	0,98	0,32
	Education	108	2,83	0,72		

and maturity, the relationship between approaches to learning and gender differences is less established (Duff et al., 2004). However, two studies carried out by Sadler-Smith and Tsang (1998) and Duff (2002) have found that male students scored higher than female students on the deep approach to learning. In this study, also, we found significant differences between males and females. Males know both approaches more than females. Dural (2008) found a meaningful way the teacher candidates at the .001 level and academic success in college differ by gender. Accordingly, the female appear to be more successful than male students. In this case, females may be successful due to the higher level of learning motivation. Adverse to our study, various studies (Aries et al., 2004; Bay et al., 2004; Özay et al., 2003; Saracaloğlu et al., 2004) found that female students were more successful than male students. In this spectrum, research are available with the results to support each findings.

According to the results of the study, the school of Physical Education and Sport's' Variable is caused mainly by the practical lessons done by the students offering the course. These movements are important for practical courses, without which they are less likely to accurately use and assimilate the skillsassimilation. Gieve and Clark (2005) urge that it is important to recognise that different students may perceive a learning environment and learning method differently, based on their learning preferences and approaches. Our study shows that sports faculty students use more deep approaches than surface approaches; also, sports faculty students have higher averages than educator students. These results may be due to sport features. Because improving sport skills depends on more effort, patience and perseverance and takes a long time, like deep approaches. As a result, regarded as the future studies, it

is important to investigate the university students' study approach (Topkaya et al., 2011). According to results of gender and age, the study found that the faculty attended variables were predictors of the student study approach. The quality of the teaching-learning process in higher education planning, assessing learning and changing students' behaviour and learning lessons, should be trying to change perceptions about work in a positive direction. Understanding of the learning processes of university students is important in the context of ongoing changes especially educational (physical education and teacher education) curriculum.

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

The guiding effects of a critical reading program on the use of external reading strategies when confronting an ironical text

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This study employed a sample of 60 pre-service teachers to examine the guiding effects of under-standing critical reading theories on using external reading strategies such as note-taking and underlining when confronting an ironical literary text. The study broke down the teachers into one control group of 30 teachers and one experimental group of 30 teachers. Two ironical texts were used to collect data from the sample of pre-service teachers - one read before the experimental group received instruction in critical reading theories and the other after such instruction which led to the finding that the entire sample of pre-service teachers mostly summarized and read the texts superficially before they had been exposed to training in critical reading instruction. After undergoing the critical reading instruction, most of the pre-service teachers in the experimental group who had previously summarized the subject text now rewrote the author's expressions, which is indicative critical reading. When the notes taken and the expressions underlined by the critical readers were analyzed, it was determined that critical readers underlined and took notes of more critical points more and summarized less.

Key words: Critical reading, reading strategies, pre-service teachers, external strategies.

INTRODUCTION

Because comprehension consists of active and complex processes, it is important to use reading strategies because they provide opportunities to learn methods with which to approach a text. Students have been shown to prefer certain reading strategies, such as note-taking and underlining, when reading texts in their educational environments (Lonka et al., 1994; Slotte and Lonka, 1999). They use these strategies to emphasize important ideas in the text, to summarize the content of the text, and to rearrange or reflect their ideas about the subject of the text. Reading strategies such as underlining, emphasizing, note-taking, making extra explanations and outlining the general framework of the subject produce external presentation. The cognitive processes that help produce these external representations (presentations) are called external strategies (Kobayashi, 2007). Some researchers call these overt responses (Todd and Kessler, 1971), external learning strategies (Canelos et

al.,1984), and/or complex study-reading strategies (Caverly et al., 2000). There is substantial evidence showing that external strategies are useful for conducting various cognitive tasks in academic situations, such as learning from a single text (Peverly et al., 2003), writing a composition (Benton et al,. 1993); learning during class (Kiewra et al., 1991) and problem-solving (Cary and Carlson, 2001; Hegarty and Steinhoff, 1997). In addition to these strategies, external strategies are also tools for understanding students' reading strategies (Caverly et al., 2000).

Conversely, critical reading is a meta-cognitive process in which the reader interacts with texts, asks questions, makes predictions, makes connections via prior knowledge and experiences, breaks down prejudices, perceives hidden meanings and builds new knowledge (El-Hindi, 1997). In other words, critical reading is reading the text suspiciously and analytically and then evaluating it (Douglas, 2000). In this context, the factors that potentially affect the comprehension of ironical texts might include critical reading and the use of external strategies while reading.

In the literature review, only one study was found that aimed to determine both which external strategies are used by students while reading a text critically and how such strategies are being used, although previous studies have examined reading strategies and critical reading as part of reading pedagogy and despite the acknowledged importance of these two variables in teaching reading (Kobayashi, 2007). Kobayashi (2007) aimed to discover the effects of critical reading on the use of external strategies, such as note-taking and underlining. That study revealed that students who read critically used strategies such as note-taking and underlining more often than students who read less critically; the latter group tended to use summarizing techniques more. Some studies in the literature review examined the relationship of the external strategies used in assessing critical reviews of a text after reading it and the external strategies used while reading the text (Lonka et al., 1994; Slotte and Lonka, 1998, 1999). Lonka et al. (1994) found in their studies that most students used various external strategies such as underlining, note-taking and building mind maps while reading a text during a university entrance exam. Slotte and Lonka (1998) found that the efficacy of the usage of notes that are taken while writing a composition might change depending on the quality of the writing task assigned; that study determined that note-taking affected both the review and the process and that there was a positive relationship-connection between the amount of note-taking and comprehension of the text.

Analyses of studies of reading skills have shown that reading purpose affects students' reading comprehension (Bråten and Samuelstuen, 2004; Linderholm and Van Den Broek, 2002; Van Den Broek et al., 2001). In other words, the students' objectives in reading affect their note-taking and underlining behavior. According to Ryan (2001), note-taking is a purpose-oriented activity, i.e., students who have different purposes while taking notes about a text they are reading will determine what notes to take depending on what they plan to write about. In this context, critical readers' use of external strategies is expected to vary from those of less critical readers.

According to the demand model of Caverly et al. (2000), talented readers can adjust external strategies to their task demands. Kobayashi (2009) found that adult readers could adjust external strategies according to the reading direction when reading difficult texts. Previous studies have shown that different types of external strategies encourage students to address various types of texts differently (Caverly et al., 2000; Kiewra et al., 1989; Lonka et al., 1994). Thus, if readers use specific external strategies based on various reading purposes, the effects of using external strategies can be expected to change accordingly. In other words, an interpretation of an ironic text might depend on whether its readers adjust their external strategies to meet the reading purpose. Thus, this study also aimed to show whether providing readers with a reading purpose in advance affects how they use external strategies.

The review was used to evaluate critical reading because it makes students connect with their prior knowledge and experiences and contains evaluations based on different variables. The summary was used to evaluate less critical reading because it typically involves deleting unimportant and unnecessary knowledge, choosing important sentences related to the topic and forming a subject sentence that is not clearly written in the text (Brown and Day, 1983). By its nature, summarizing is necessary for readers to infer a message from the text that the author aims to provide, but it is not appropriate for readers to undertake a critical stance in a summary (Kobayashi, 2007). Thus, summarizing was selected because it was expected to limit critical reading.

Briefly, this study aimed to investigate the external strategies that are used by students who read more and less critically while reading a text that requires critical reading. Consistent with this purpose, this study first addressed the questions of 'Which external strategies for reading more and less critically do students use when they are given opportunities to choose their external strategies to use while reading?' and 'What type of notes do students take and what do they underline during more critical reading compared with less critical reading?'.

The purpose of the study

This study aimed to investigate the guiding effects of critical reading on the usage of external strategies (such as note-taking and underlining) while reading an ironical text.

Consistent with this purpose, the research questions of this study are as follows:

What do the pre-service teachers in the experimental and control group infer from the ironical text

1. before the program?
2. after the program?

What are the external strategies that the pre-service teachers in the experimental and control group use while reading an ironical text
1. before the program?
2. after the program?

Is there a meaningful difference in performance with respect to the external strategies used by the pre-service teachers in the experimental and control groups before and after the program as applied to summary (less critical reading) or review (more critical reading) of the text?

METHODOLOGY

Research model

This research first aimed to determine whether there was a guiding effect of critical reading on the use of external strategies (such as note-taking and underlining) while reading an ironical text. In addition, 'Critical Reading Activities' and 'The Existing Instruction' were investigated to determine whether they have effects on the critical reading skills of pre-service teachers. Therefore, mixed methods designs comprising both qualitative and quantitative data collection methods and data analysis were used in this study (Creswell, 2008).

Research sample

The study was conducted with 60 undergraduate students in the Elementary Education Department at a state university in southwest coast part of Turkey during the 2009-2010 academic year and consisted of one experimental group and one control group. While determining the distribution of the pre-service teachers in the experimental and control groups, they were analyzed in terms of certain criteria, such as reading books and the family characteristics of the pre-service teachers that influence critical reading skills to provide balance between the groups. It took 18 course h to implement the program of critical reading instruction (PCRI). The researcher implemented the PCRI in the experimental group, whereas a related instructor implemented the existing program in the control group.

Data collection instrument and procedure

Reading texts were given to the pre-service teachers in the experimental and control groups before and after implementation to determine their comprehension levels when reading an ironical text; the pre-service teachers were asked to summarize or review what they comprehended from the text. The reading strategies that the pre-service teachers used while reading the ironical text were defined by examining the texts.

Materials: The text by Ferid Edgu titled 'The Relationships of Our Politicians with Culture and Art' was used in the pre-test, and the text by Aziz Nesin titled 'The Neutron Bomb Will Save Civilization' was used in the post-test to determine the reading strategies employed by the pre-service teachers in our sample while reading the ironical text. 'The Relationships of Our Politicians with Culture and Art' consists of 833 words and 5737 characters in Turkish. 'The Neutron Bomb Will Save Civilization' consists of 693 words and 4635 characters in Turkish.

Procedure: Kobayashi's (2007: 366) procedure and coding is applied. Participants were given an envelope containing the two-page: ironical text and a sheet of white paper. They were told to read the instructions attached to the envelope. The instructions for the experimental and control groups stated: 'You will read a text. Try to answer the questions: 'What is the author trying to say?' or 'What is the main idea/ argument being presented?' Write your opinion regarding the text on the answer sheet. You may prefer to summarize or review the text after reading it. You may underline and take notes on the white paper and in the margins of the text, if necessary.' Participants were given 45 min. After the session, the white papers, text papers, and essays were collected.

Coding: Each participant's white paper and text papers were coded as note-taking strategy use if any intelligible words or marks (e.g., question marks, arrows) were written down, and/or as underlining strategy use if portions of the text (e.g., words, phrases, sentences) were highlighted by lines, brackets, or boxes. The author and a second judge who was blind to the experimental conditions coded all of the white papers and text papers (Kobayashi, 2007, p. 366). The interpreter agreement was 96%. Disagreements were resolved by discussion.

''To assess the effectiveness of reading orientation, each essay was classified as a critique or summary. Essays were coded as critiques if they included participants' opinions about the text-writer's argument and as a summary if they described nothing but the gist of the text-writer's argument. An independent coder was asked to code all of the essays'' (Kobayashi, 2007, p. 366). The percentage of agreement with the author was 95%. Disagreements were resolved by discussion.

Teaching methods and implementation

In this research, the program of critical reading instruction (PCRI) was used in the experimental group and the existing program was used in the control group.

PCRI from Goatly (2000) was implemented to the pre-service teachers in the experimental group during the study. The critical reading activities in this program were provided and the instruction was conducted mostly oriented with these activities. According to this program, the program of critical reading instruction consists of three stages. The first stage is 'Code Declination and the Description of the Text (What is meant in the text?)'; the second stage is 'The Interpretation and Inferential of the Text (What does the author narrate by means of the text?)'; and the third stage is 'The Ideology behind the first and second stages and the Determination of the Explanations (What are the ideologies lying behind the text?)'. A three-hour course of PCRI was arranged during 18 course hours by considering the subjects that were critical reading skill oriented.

Data analysis

In the research, Chi-square analysis was undertaken on the

Table 1. The theme, code and frequency distribution about the meaning that the pre-service teachers formed from the reading text before PCRI

Theme	Sub-theme	Code	F	
			Experimental group	Control group
Deeper Meaning	Irony	Usage of cynical language	6	5
		Usage of lampoons	4	4
		Usage of parables	2	1
Superficial Meaning	Prejudice	Not knowing the Turks	7	8
		Politicians' following what's going on in the country and in the world	4	4
		Politicians' having cultural accumulation	3	4
		Politicians' improving themselves	2	2
		Thinking wrong about the Turks	2	2

quantitative data and content analysis was performed on the qualitative data.

FINDINGS

Research Question 1: The qualitative findings obtained from the ironical texts about reading comprehension

Before the program of critical reading instruction, the pre-service teachers in the experimental group and control group were asked what they had inferred from the ironical text and its reasoning. The theme, code and frequency distribution of the answers to these questions are presented in Table 1.

As Table 1 shows, the answers of the pre-service teachers meet in the two themes of deeper and superficial meaning. Twelve pre-service teachers in the experimental group and 10 pre-service teachers in the control group claimed that the message related in the essay, 'The Relationships of our Politicians with Culture and Art', which was given before the program of critical reading instruction, indicated that the author wrote the essay cynically, using lampoon and parable, and that the author tried to make the exact opposite argument. Two pre-service teachers with this view expressed their opinions as '*In this text, which contains plenty of lampoons, the author used a sarcastic style to reveal reality as if the situation written about already existed*' (EPST11), '*I think the author wanted to express the exact opposite of the literal meaning by using parables*' (CPST33).

According to Table 1, 18 pre-service teachers in the experimental group and 20 pre-service teachers in the control group claimed that the message of 'Turkish politicians read' in the essay given as before the program of critical reading instruction that reflected the

view that politicians do not read was an incorrect hypothesis that was developed by prejudiced people. The expressions of two pre-service teachers with this view were '*...Our politicians are interested in art and our cultural inheritance; they read and are engaged in research about these subjects. They are confident that they have some claim to this status*' (EPST) and '*Our politicians are educated people that have reached this status*' (CPST37).

After the program of critical reading instruction was implemented, the pre-service teachers in the experimental group and the control group were asked about the meaning they perceived from reading the subject text and its reasoning. Themes, codes and frequency distributions of the answers regarding this subject are presented in Table 2.

In the essay titled, 'The Neutron Bomb will save the civilization', which was used as the text for the after the program of critical reading instruction stage, Table 2 shows that the answers of the pre-service teachers can be broken down into two themes of deeper and superficial meaning. Twenty-eight pre-service teachers in the experimental group and 12 pre-service teachers in the control group claimed that the author was against war and the damages of war and against the neutron bomb; in addition, these pre-service teachers believed that the author was trying to show that human beings are valuable. These respondents stated that the author wanted to argue for the opposite view of what he literally wrote in the text by using irony and cynicism. Two of the pre-service teachers expressed their views as '*In fact, the author wants the reader to infer the exact opposite view of what he discusses in the texts. The author wants to emphasize that he is against war by figurative expressions, implications and irony.*' (EPST14) and '*By using his cynical style, the author criticized the views of people who see think that war is population planning, that*

Table 2. Themes, codes and frequency distributions about the meaning that the pre-service teachers perceived in the experimental and control groups from reading the text after PCRI.

Theme	Sub-theme	Code	F	
			Experimental group	Control group
		Implying the exact opposite meaning	9	5
		Usage of irony	8	-
	Irony	Usage of a cynical language	5	3
		Allegorizing	-	3
Deeper Meaning	Word Analysis	Dictating the word "civilized"	3	-
	Evidence	Usage of numerical data	2	-
	Metaphor	Usage of metaphors	1	1
Superficial Meaning	Foreknowledge	Is necessary for civilization to continue	1	14
		Buildings, museums, temples and libraries are the sources of civilization	1	4

the bomb is bug spray and that human beings have the same worth as flies by using a cynical style'(CPST54).

According to Table 2, two pre-service teachers in the experimental group and 18 pre-service teachers in the control group believed that the author was for the war and the neutron bomb; these respondents thought that the author saw civilization as the buildings that are the creations of human beings and that war and the neutron bomb are required to save and provide for civilization's continuance. Two pre-service teachers with this view represented their opinions as *'The author thinks that war is natural and is required for the maintenance of civilization' (EPST29)*, and *'The author tries to show the reader that war is a natural thing indeed' (CPST39).*

Research Question 2: The qualitative findings obtained from ironical texts as related to reading strategies

Before and after implementation of the PCRI, the pre-service teachers in both the experimental and control groups were asked to summarize or review the text after reading it and were left free to choose whether to summarize or review the text. Before the PCRI, 18 of the pre-service teachers in the experimental group and 20 in the control group preferred summarizing the text, whereas 10 pre-service teachers in the control group and 12 in the experimental group preferred reviewing. After the PCRI, 28 of the pre-service teachers in the experimental group and 12 in the control group preferred reviewing, whereas two of the pre-service teachers in the experimental group and 18 in the control group preferred summarizing the text.

Before and after implementing PCRI, the external

strategies that the pre-service teachers in the experimental and control group used while reading an ironical text were studied. The external strategies that the pre-service teachers used and the codes and frequency distributions of the places in which they used these strategies are shown in Table 3.

Table 3 shows that six of the pre-service teachers in the experimental group who preferred summarizing the text underlined the main idea before PCRI. Five of the pre-service teachers in the experimental group took notes regarding the main idea, and three pre-service teachers in the experimental group who preferred reviewing the text underlined the main idea and four of these underlined its irony, whereas two of these pre-service teachers both underlined and took notes of the metaphors and three both underlined and took notes of the irony. In the control group, eight of the pre-service teachers who preferred summarizing the text underlined the main idea. Five pre-service teachers who summarized the text took notes of the main idea. Five pre-service teachers in the control group who had written a reviewing text underlined the main idea, and five both underlined and took notes of the main idea. The pre-service teachers in both the experimental group and the control group who wrote a text reviewing what they read did not use the note-taking external strategy.

Table 3 shows that one of the pre-service teachers in the experimental group in the after PCRI who had preferred summarizing the text they read underlined and took notes regarding the main idea. Three of the pre-service teachers in the experimental group who preferred reviewing the text they read underlined ironic passages; five pre-service teachers both underlined the question and took notes of their own questions about the text, five both underlined and took notes of the metaphors and 12

Table 3. Theme, code and frequency distribution of the external strategies that pre-service teachers used while reading the ironical text before and after PCRI.

Groups	Preferences	The external strategies	The places	Before PCRI	After PCRI
				F	
Experiment	Summarization (Less critical reading)	Underlining	Main ideas	6	1
			Total	6	1
		Note-taking	Main ideas	5	1
			Total	5	1
		No note-taking or underlining	Total	7	-
	Review (Critical reading)	Underlining	Main ideas	3	1
			Ironies	4	3
			Emphasized words	-	1
			Figurative expressions	-	1
			Total	7	6
			Questions	-	5
			Metaphors	2	5
		Note-taking and/ or underlining	Ironies	3	12
			Total	5	22
Control	Summarization (Less critical reading)	Underlining	Main ideas	8	7
			Total	8	7
		Note-taking	Main ideas	5	7
			Total	5	7
		No note-taking or underlining	Total	7	4
	Review (Critical reading)	Underlining	Main ideas	5	6
			Total	5	6
		Note-taking and/ or underlining	Main ideas	5	6
			Total	5	6

both underlined and took notes of the ironic passages in the text. Seven of the pre-service teachers in the control group who summarized the text they read underlined the main ideas, and seven took notes of the main idea. Six pre-service teachers in the control group who preferred reviewing underlined them.

Research Question 3: The quantitative findings obtained from ironical texts as related to reading strategies

The third question of this study (Is there a meaningful difference in performance with respect to the external strategies used by the pre-service teachers in the experimental and control groups before and after the program as applied to summary (less critical reading) or review (more critical reading) of the text?) was analyzed using a Chi-Square analysis. Before the program, a Chi-square analysis revealed that the difference between the experimental group and control group was not statistically significant (for summarization [$\chi2$ (2) = .181, $p>.05$]; for review [$\chi2$ (2) = .153, $p>.05$]). However, after the program, a Chi-square analysis revealed that the difference between the two groups was statistically significant (for review [$\chi2$ (1) = 4.353, $p< .05$]). Consequently, it can be stated that PCRI is effective on the pre-service teachers' reading comprehension and the external strategies used while reading.

DISCUSSION

The results obtained from this research can be addressed and interpreted in two groups as reading comprehension (the message inferred from an ironical text) and the external strategies that are used to read the text. First, the field scanning results that involved the effects of PCRI on the pre-service teachers' reading comprehension achievements also support the findings of previous

research. The study conducted by David (2009) found out that critical reading significantly increases academic achievement compared with the traditional method. Cooper and White (2006) showed that critical reading increases students' reading comprehension achievement scores. Sahinel (2001) demonstrated that critical thinking skills and the approach of improving integrated language skills are more effective for students' academic achievement than traditional teaching methods.

To comprehend, the individual must be able to understand the structure of the text, understand the content of the text, and interpret and criticize the text. Criticizing the text is the action of the reader's thinking about and evaluating the text. In this context, PCRI can improve reading comprehension because it shows how to read a text critically, which is the final step of reading comprehension.

According to the qualitative findings of this research, before the program, a great majority of the pre-service teachers could not find the deeper meaning in the subject text and misunderstood its message. After PCRI, a great majority of the pre-service teachers gleaned the deeper meaning in the text and understood its message correctly. The purpose of reading is to comprehend the text, but it is not sufficient to comprehend the text solely on a literal basis. Roussey and Piolat (2008) found that critical reading is a process that requires more cognitive effort than reading comprehension. The reader must be able to evaluate, interpret and criticize the text after reading it. Critical reading is a process that requires regular questioning, investigation and a suspicious approach toward what the author says (Devine, 1986). A critical reader should evaluate the author's statements thoroughly, carefully, elaborately and purposefully. For this reason, the critical reader generally notices and defies the author's assumptions, perspectives and objectives and engages with the author by producing alternatives to the author's opinion, belief and remarks as expressed in the text (whether literally or figuratively). The critical reader attempts to distinguish knowledge that is related to the author's hypothesis from knowledge that is not related to the author's hypothesis and to ignore things far afield. The critical reader can evaluate the efficacy of the author and the reliability of the data and must be able to define whether there are propaganda tools, such as denotations and overgeneralization, utilized in the text. These all depend on the reader's foreknowledge and habits regarding the control of cognitive processes. In other words, a critical reader must know something about the topic he reads and must be able to use mental tactics – such as evaluating the sufficiency of the knowledge, data collection, and hypothesis formation – while reading a text (Baker and Brown, 1984). In critical reading, the individual must clarify the purposes of the reading, define the important and remarkable points in the written text, question himself or herself to determine what type of

comprehension occurred while reading and take the necessary precautions when problems occur during the formation of metacognitive activities.

This research also aimed to define the external strategies that pre-service teachers used while reading an ironical text on both before and after PCRI basis. Consistent with this purpose, the pre-service teachers were asked to either review what they read (which requires critical reading) or summarize (which requires less critical reading). Before PCRI, the pre-service teachers mostly preferred summarizing the text. After PCRI, the pre-service teachers in the EG mostly preferred reviewing the text and the pre-service teachers in the control group mostly preferred summarizing the text. The majority of the pre-service teachers who preferred summarizing rewrote the author's expressions. Conversely, the pre-service teachers who preferred reviewing took notes, underlined expressions and used less summarization. It was also determined that the critical readers underlined and took notes of more critical points and used less summarization when the notes that were taken and the points that were underlined by the pre-service teachers were analyzed. In this context, it can be said that pre-service teachers who read critically took notes that were idiosyncratic to themselves.

The findings obtained from this research parallel those obtained by Kobayashi (2007), who found that students who read critically used the external strategies of underlining and note-taking, which is idiosyncratic to themselves, whereas the students who read less critically used summarization more. Critical readers took more critical notes and underlined more expressions compared with readers who read less critically. Conversely, readers who read less critically took more summarizing notes than critical readers.

These results demonstrate that students decide on external strategies depending on the important require-ments of critical reading, such as showing resistance and judging value. Moreover, the external strategies used by the students were goal-oriented (Ryan, 2001). These students were sensitive to the purposes of reading and about deciding on external strategies while reading a text. The flexible use of text-processing strategies is characteristic of skilled strategy users (Bråten and Samuelstuen, 2004; Paris et al., 1983; Pressley and Afflerbach, 1995).

In other words, the reading purpose might have affected the external strategies employed. Critical reading involves thinking about a text that is being read, thinking over the rights and wrongs in the text and interpreting the subject matter. Thus, reading is not limited to comprehending directly what is written. Thinking while reading, interpreting the subject or seeing what is written critically can also be undertaken (Ozdemir, 2002). Thus, criticism consists of two parts: criticizing the subject/purpose and evaluating the interpretations. In a critical

investigation, what is said in the text is presented first. Then, evaluations and interpretations are made (Spivey, 1997). Moving from these data, it can be said that the external strategies of note-taking and underlining – techniques used by critical readers – to form and locate the subjects of criticism are found in the first half of the process of emphasizing and summarizing and are an important production of critical readers. Emphasizing contributes to choosing and marking important information in the text that the readers can later include in either summaries or critical reviews (Caverly et al., 2000).

Conclusion

In conclusion, this study found that prior to the experimental implementation, pre-service teachers mostly preferred summarizing the text that they read and did not comprehend the message of the author and read the text superficially. After PCRI, the pre-service teachers in the experimental group mostly preferred reviewing the text and the pre-service teachers in the control group mostly preferred summarizing the text. Most of the pre-service teachers who summarized the text rewrote the author's expressions. It was also determined that the pre- service teachers who had preferred commenting took notes and underlined expressions while reading. When the notes taken and the expressions underlined by the critical readers were analyzed, it was determined that critical readers underlined and took notes of more critical points more and summarized less.

RECOMMENDATIONS

Based on the results of this paper and findings in the relevant literature, it is suggested that this research is limited to the effects of PCRI on the pre-service teachers' critical reading and the external strategies they used while reading. How the pre-service teachers use the PCRI in the classroom environment remains to be investigated. In this study PCRI was used on groups whose first language is Turkish, another study can be made on groups' second languages and/or bi-languagistic groups.

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

Assessment of prospective teachers' views regarding the concept of criticism

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Critical thinking is one of the skills that exist in the Turkish course curriculum and is aimed to be acquired by students. The objective of the study is to determine prospective Turkish teachers' perspectives regarding the concept of critism, which is both a mental exercise and carries an important role in the world of ideas. In order to assess this, voluntary interviews were conducted with prospective teachers studying their 2nd and 3rd years at Department of Turkish Education in the Faculty of Education at Yildiz Technical University during the spring semester of the 2014-2015 academic year. To determine the participant pool, the typical case sampling method—one of the purposive sampling methods—was used, and 45 prospective teachers were interviewed. A semi-structured data collection tool was developed to collect data. Descriptive analysis technique was used to analyze these data. At the end of the study, it was concluded that the majority of the participating prospective Turkish teachers do not believe that the education they receive improves their critical thinking skills. It was also seen that the participant teachers were unable to develop any methods that would help them improve their future students' critical thinking skills. The prospective teachers do have some ideas regarding how to do so; however, these kinds of ideas have never been presented to them under a an official technique or within a school course. Their ideas come from merely their personal views, which they themselves have inferred from their past experiences.

Key words: Prospective Turkish teachers, Turkish education, basic skills, critical thinking, tolerance.

INTRODUCTION

Thought and language are two concepts that are tightly interconnected. Two of the most important features of being human also occur along with these concepts: thinking and speaking. A thinker is someone who makes comments and comparisons, who asks questions and tries to understand, who is curious, who doubts, feels, gets affected, and someone who critiques. Speaking comes after thinking, and improves with the need to express to others what one thinks, how they feel and what they experience. These two abilities given to mankind are primary qualities of human, and are the basis of each idea and political structure changing the world. The man opened his eyes to the world tries to know everything happening around him since his basic needs were first met. This is a talent given to him at birth: learning and curiosity. Firstly, he learns the names of

concrete objects he can see with his eyes, then begins to use general and abstract concepts (Erden and Akman, 2008: 74). Everything around him seems interesting. With a blank mind and impulse of curiosity, he learns much more easily and quickly than adults. Thus, he improves rapidly. This period is an important period in which an intensive progress is seen in all areas of development (Oruc et al., 2011: 285). This period described as pre-school period is followed by primary school period. Children starting primary school take their steps to formal education and continue this compulsory education during their age periods when they will give many of the most important decisions of their lives. So that, this compulsory education should offer him a lot, even if not everything that will be needed throughout his life. Freedom is not just to defend some political opinions and to vote. Freedom is to be open to the differences and for this, one must be educated. The most known and the most important role of schooling in education is to provide people a real freedom (Feldman, 1973: 53).

The teacher is thought not to contribute to skill of "good and accurate thinking" because s/he teaches abiding by the curriculum and rules (Pither and Soden, 2007: 247). In higher education, two different approaches come to the forefront: teacher-centered approach and student-centered approach (Parpala and Lindblom-Yläne, 2007: 356). Kember (1997: 264-265) has compared these two educational methods in his study. He has noted that the teacher-centered education is knowledge gaining and structured knowledge forwarder; the student-centered education is facilitating the understanding, and encouraging conceptual change and intellectual development. During both elementary school, middle school, high school, and university education periods, individuals who perform their mental activities in a free atmosphere, will also develop themselves in terms of critical thinking skill.

General purposes in 2006 Elementary education Turkish curriculum, the basic skills which will be given in the pursuit of these objectives and also the acquirements in regard to themes to be covered in each course are certain. Basic skills are identified as (MOE, 2006: 5): 1. Using Turkish accurately, nicely and efficiently, 2. Critical thinking, 3. Creative thinking, 4. Communication, 5. Problem solving, 6. Research, 7. Decision making, 8. Using information technology. In addition, "With the Turkish course curriculum, individuals who understand what they listen, what they read and what they watch; who express their feelings, thoughts and dreams, think critically and creatively, take responsibility, who are entre-preneurs and compatible with the environment, search events, status and information with their experiences, question, critique and interpret them and make habits of these, with aesthetic pleasure and sensitivity to the national values are intended to be raised "(MOE, 2006: 3). 2006 Turkish curriculum prepared in line with these objectives includes activities contributing to critiquing,

interpreting, and thinking critically. Analyzing the questions in 6th grade Turkish workbook in terms of their contribution to critical thinking, Kucuk (2008: 502) has come to a conclusion that these questions were insufficient for critical thinking. The studies related to the critical thinking skills of prospective teachers (Kocak et al., 2015; Kurum, 2002; Cetin, 2008; Akar, 2007; Zayif, 2008; Cetinkaya, 2011) reveal that the critical thinking skills of the prospective teachers have been at medium and low levels. Indicating that students should have a clear understanding for the development of critical thinking skills, MacKnight (2000: 39) also emphasizes that they need to have the following sub-skills, firstly, in order to have the necessary social skills:

1. Being able to ask the right questions
2. Listening to others
3. Studying by turns and sharing works
4. Helping others learn
5. Respecting the opinions of each other
6. Being able to build new thoughts over the opinions of others
7. Developing own ideas and understanding
8. Thinking with new methods.

The individuals who have these skills won't experience difficulty in achieving critical thinking, won't follow certain ideas blindly while understanding what happens around them from a quizzical viewpoint and will be able to respect people who have different opinions.

With its impact on both education and social development, critical thinking skill has an important place. Since its importance has become more noticeable in recent years, many studies have been conducted about critical thinking. Some of these researches are for determining primary, secondary and higher education teachers' views on critical thinking (Yildirim, 2005; Korkmaz, 2009; Meral and Semerci, 2009; Narin 2009), and some of them are for determining the opinions of prospective teachers who study at the departments of teaching, such as; Classroom, Preschool, Social Studies, Turkish, Elementary, Mathematics, Science, Arts and Crafts, Music, Physical Education, Guidance and Counseling, Philosophy, Computer and Instructional Technology, Hearing Impaired, Mentally Disabled, German, French and English teaching departments on critical thinking. (Kurum, 2002; Turnuklu and Yesildere, 2005; Ozdemir, 2005; Cubukcu, 2006; Akar, 2007; Gulveren, 2007; Cetin, 2008; Dutoglu and Tuncel, 2008; Zayif, 2008; Sacli and Demirhan, 2008; Sen, 2009; Ekinci and Aybek, 2010; Besoluk and Onder, 2010; Cetinkaya, 2011; Cekin, 2013; Yuksel, 2013; Can and Kaymakci, 2015; Kocak, 2015).

Varied conclusions have been reached in these studies about the views on critical thinking. Gulveren (2007), Akar (2007), Zayif (2008), Cetinkaya (2011), Yuksel et al. (2013) and Can and Kaymakci (2015) determined that prospective teachers' critical thinking scores were low.

Kurum (2002), Tumuklu and Yesildere (2005), Cetin (2008), Ozdemir (2005), Sacli and Demirhan (2008), Sen (2009), Besoluk and Onder (2010) and Kocak et al. (2015) found that prospective teachers' levels of critical thinking were average. Cekin (2013) has found that level of critical thinking skills of prospective religious culture and ethics teachers is in high level. In his study related to the teachers working in primary, secondary and higher education institutions, Korkmaz (2009) has stated that the participants' views on critical thinking were in average level. In a study on textbooks, Kucuk (2008) analyzed the questions in the 6th grade Turkish workbook in terms of their contributions to critical thinking and reached to the conclusion that there was no sufficient contribution to it.

In order to criticize accurately, one should comprehend the meaning of criticism thoroughly. It should be known that criticism is not a slander and that its aim is trying to fill the deficiencies and being useful without offending the opposite party should not be forgotten. Actions of critical thinking must be fulfilled by considering from this angle. These kinds of writings have undertaken the task of introducing the subjects they handled to the readers with all details in extenso and they are the important kinds which should take place in the Turkish education. It should not also be ignored that these writings provide a positive contribution to the students' personal developments while developing their reasoning abilities (Beyreli et al., 2006: 118; Karakus, 2012: 45).

Problem of the study

In this research, the answer of the question of "what are the perspectives of prospective teachers to criticism?" has been sought.

Sub-problems of the study

1. Are prospective teachers open to criticism and do they make the definition of criticism accurately?
2. Did the pre-university education which prospective teachers received contribute to their development of critical thinking skills?
3. Has the university education which prospective teachers have already been receiving contributed to their development of critical thinking skills?
4. Which method will prospective teachers follow when they become teachers in order to develop their students' critical thinking skills?

Objective and importance of the study

In the development of reasoning, decision-making, comparing, thinking and critical thinking skills of elementary, middle and high school students, teachers play an active role as much as curriculum. Prospective teachers'

personal views and experiences will combine with their education and be shaped. The teachers who have the ability to look at different perspectives to the events, know how to criticize accurately and constructively, and have strong reasoning skills will educate children who have developed/ been developing the same skills. The solution to many incidents caused by intolerance in society lies here. Different individuals, different approaches, and different applications will bring peace to the society, if they bring the respect along with them. If the basic skills which are in the 2006 elementary Turkish course curriculum (accurate and efficient use of Turkish, critical thinking, creative thinking, communication, problem solving, research, decision making, use of information technology) are given to the students, a society in which people are tolerant, respectful and stoical to each other will emerge spontaneously. Therefore, it is useful to measure the basic skills of teachers who will educate students. This study has been conducted in order to find prospective teachers' perspectives on criticism and critical thinking.

METHOD

Research model

The study is a qualitative study. Studies in which qualitative data collection methods such as observation, interview and document analysis are used, and where a qualitative process to put forward the perceptions and events in the natural environment in a realistic and integrated manner are called qualitative studies (Yildirim and Simsek, 2013: 45).

Participants

In the study, typical case sampling method which is one of the purposive sampling techniques was used. In general, individuals and institutions that have information in this regard, various databases prepared in this matter or research results are used in order for selection of typical cases (Yildirim and Simsek, 2013: 138). This sampling method requires to determine a typical case among many cases in the research population and collect data through this sample (Buyukozturk et al., 2010: 91). In the study, prospective Turkish teachers were selected accordingly and 2014-2015 academic year studying at Yildiz Technical University, Faculty of Education, Department of Turkish Education was conducted interviews with 45 volunteer teachers. Thirty-five of the individuals included in the study group were female, and ten is male.

Collecting and analyzing data

At the data collection stage, the semi-structured interview form was developed in order to determine the data on the views of the prospective Turkish teachers on criticism. Interview is defined as a predetermined mutual and interactive communication process based on asking questions and answering style for a serious purpose (Yildirim and Simsek, 2013: 147). Semi-structured inter-views cover the interview of answers of predetermined questions (Balci, 2004).

While preparing the interview form, which questions would be

asked were determined firstly. While the form was been being created, the principles such as: preparing the easily understood questions, asking open-ended questions, preparing focused questions, avoiding to manipulate, avoiding to ask multi-dimensional questions and organizing questions in a reasonable way (Yildirim and Simsek, 2013: 156) were considered. After the interview form was completed, a pre-interview was conducted with a prospective Turkish teacher, then his/her answers were parsed in written. Incomprehensible questions were changed and the prospective teacher who had been taken to the interview was excluded from the research.

The questions used in the interview form are as follows:

1. What do you understand when it is said "Criticism"?
2. What does it mean "being open to criticism"?
3. Are you open to criticism? Do you feel uncomfortable about being criticized?
4. Do you get excited while talking in public or lecturing about a particular topic? Does your being excited come from the fear of being criticized?
5. What does Critical thinking mean for you?
6. If it is considered that improving students' critical thinking abilities is among the tasks of textbooks and teachers, do you think the education you have had so far is useful in this context?
7. What methods will you follow to improve your students' critical thinking abilities when you become a teacher?

The interview form used in the study was broached to the experts who work in Faculty of Education at Yildiz Technical University in order to ensure the content validity of the form. In accordance with the opinions and the suggestions of the field experts, the form was finalized. There are seven questions in the interview form. During the interview, these questions were asked to a prospective teacher one by one and requested him/her to answer the questions freely. The teacher's responses were recorded in written by the researcher and 90 pages of data were collected from participants at the end of study. In order to analyze these data, descriptive analysis technique was used. Descriptive analysis is a kind of analysis technique in which the obtained data is summarized and interpreted according to the predetermined themes and the direct quotations are often used in order to reflect the views of interviewed individuals dramatically and the obtained results are interpreted within the framework of cause-and-effect relationship (Yildirim and Simsek, 2013: 256). Accordingly, first of all, categories were created based on the research questions and the conceptual dimension of the study. In the second phase, which data would be held under which theme was set. In the final stage, the data were presented as frequencies and percentages and the participants' opinions were given directly and some abbreviations such as PT1, PT2 were used for prospective teachers.

FINDINGS

The data collected as a result of 45 interviews with the students were grouped and each question was given with its percentage and frequency values together in a table frame.

Findings regarding the prospective Turkish teachers' views on the meaning of criticism

The question of "What do you understand when it is said "Criticism?"" has been asked to the prospective Turkish

Table 1. Findings regarding the prospective Turkish teachers' views on the meaning of criticism.

	f	%
To state positive-negative opinion	33	73,3
To state only negative opinion	5	11,1
Thought, interpretation, assessment	7	15,5
Total	45	100

teachers and theirs answers have been presented after grouping them and creating sub-themes in Table 1.

As shown in the table, prospective Turkish teachers generally have the correct information on the definition of criticism. However, 26% of them identified the criticism as only stating a negative opinion or thought and interpretation.

PT1 answers this question as follows:

Criticism which means to critize an author, a poet or a work in literary field in a positive or negative way includes more comprehensive meaning in social or daily life. It is evaluating and judging a person, an event, a character, or objects in any case.

PT2's views on this subject are as follows:

To me, criticism is to show wrong sides of a wrong behavior or a wrong idea. It is also a judgment.

The question of "What does it mean "being open to criticism?"" was asked to the prospective Turkish teachers and their answers were collected under 8 major headings and then the created sub-themes have been presented in Table 2.

As seen above, different answers were obtained from prospective teachers. All questions are about being open to criticism. The replies are different, but the things that are desired to express are similar.

PT3 made the following comments in this regard:

Being open to criticism is to know the fact that we are not perfect. We also have the sides that need to be developed. Therefore, criticism can be useful in this regard. To be open to criticism means to be open to development.

PT4 thinks that:

It is to endure the positive and negative views reported about any person or issue as long as they are not respectful.

PT5 associated it with tolerance and said:

Being open to criticism to be able to show the

Table 2. Findings regarding the prospective Turkish teachers' views on being open to criticism.

	f	%
Not fearing to be criticized, being ready to hear one's own imperfections	4	8,8
Being open to the comments about oneself	6	13,3
Being able to bear to hear one's own negative sides	6	13,3
Knowing that no one is perfect	1	2,2
Being open to be judged	4	8,8
Not reacting about negative comments	4	8,8
Being respectful, improving oneself	10	22,2
Being able to be understanding and tolerant	10	22,22
Total	45	100

Table 3. Findings regarding the prospective Turkish teachers' views on if they are open to criticism.

	f	%
Open to criticism	20	44,5
Partially open to criticism	18	40
Not open to criticism	7	15,5
Total	45	100

sametolerance when we are warned about our negative behaviors, as we show it when we are told about our positive behaviors.

The question of "Are you open to criticism?" was asked to the prospective Turkish teachers and their answers were grouped and then the created sub-themes are presented in Table 3. After the teachers were asked the question of "what it means being open to criticism", they have been asked whether they open to criticism or not. The answers to this question are different. While 44.5% of them said that they were open to criticism, the other 55.5% of them answered it as they are partially open or not open to criticism. That the prospective Turkish teachers who are thought to contribute to their students' worlds of thought are not open to criticism is quite concerning.

PT6 gave its opinion on this issue as follows:

I am a person who is open to criticism. But, since people perceive criticism as to say only negative sides, I would feel uncomfortable for being criticized.

PT7 explained if criticism is made in respect, it would not be disturbing as follows:

When it is made in the framework of respect and love and without insulting, I would not bother by criticism. But if it is made disrespectfully, I would be extremely annoyed and nervous.

PT8 also gave his/her opinion on this issue as follows:

I'm more open to criticism made by the ones who are right on their criticism. Some criticisms are made only to be offending. In addition to these, there are also criticisms affecting a person's personal development. I am, of course, always open to them.

The question of "Do you get excited while talking in public or lecturing about a particular topic? Does your being excited come from the fear of being criticized?" was asked to the prospective Turkish teachers and their answers were grouped and then the created sub-themes are presented in Table 4.

8 prospective teachers answered the question regarding why they get excited while talking before public as just because of their being before public. The number of prospective teachers who get excited because of the fear of being criticized is 8. While the number of teachers who get excited because of thinking that they do not have a grasp of the topic they talk is 10, 19 prospective teachers have been less thrilled or not excited at all. These findings show that prospective Turkish teachers do not get excited much beacuse of the fear of being criticized. The ratio of the ones feeling excited because of the fear of being criticized is 18%. These prospective teachers can be generally thought to be relaxed.

PT9 has expressed its opinion on this issue as follows:

I don't get excited, if i have full knowledge of the topic which i will narrate and I won't be afraid to be criticized.

PT10 considers as follows:

I get excited. I find it difficult to express myself in contemplation of the thought that I haven't read enough books. I always limit myself with this thought.

The question of "What does critical thinking mean for

Table 4. Findings regarding the prospective Turkish teachers' views on fearing of getting excited and being criticized while talking in public.

	f	%
I get excited for being in public	8	17,8
I get excited for fearing of being criticized	8	17,8
I get excited for not having a grasp of the topic i talk	10	22,2
I get partially excited	5	11,1
I don't get excited	14	31,1
Total	45	100

Table 5. Findings regarding the prospective Turkish teachers' views on critical thinking.

	f	%
To be able to handle the topic with its positive and negative side	9	20
To be able to see from a different point of views, think versatile	11	24,5
To accept as it is	3	6,7
Is a system of thought	10	22,2
To be able to observe and evaluate well	5	11,1
To be able to be neutral and objective	7	15,5
Total	45	100

you?" was asked to the prospective Turkish teachers and their answers were grouped and then the created sub-themes are presented in Table 5.

What critical thinking means for prospective teachers is also different. It is seen that the criticism and critical thinking views of prospective teachers who have this mentality which means that they are different from each other, but at the same time, they are completing each other are generally positive.

PT11's views for critical thinking are as follows:

Instead of making impositions that something is absolutely wrong or absolutely accurate, it is an acceptance of the idea that things can be expressed differently.

PT12 emphasizes the impact of critical thinking on the personal development and expresses his/her thoughts as follows:

I think that critical thinking is a dialectical way of thinking which is done in order to develop an event or a fact. It is also a method of self-improvement.

The question of "If it is considered that improving students' critical thinking skills is among the tasks of textbooks and teachers, do you think the education you have had so far is useful in this context?" was asked to the prospective Turkish teachers and their answers were grouped and then the created sub-themes are presented in Table 6.

Table 6. Findings regarding the prospective Turkish teachers' views on whether the critical thinking education they have had is adequate or not.

	f	%
I think it is useful	3	6,7
I think it is partially useful	5	11,1
I think University education is useful	3	6,7
I don't think it is useful	34	75,5
Total	45	100

An important part of the prospective Turkish teachers (75.5% of them) think that the critical thinking education they have had is not adequate. The expected environment in the university should be the most comfortable for free speech and exchanging ideas, but the exact opposite situation has been noted. Students who think that their education regarding to develop critical thinking is adequate are only 3.

PT13 expresses feelings of opinions on this issue as:

It did not contributed to me at all. Because throughout our education, we were just at the side of listeners. None of us were given the right to speak. Since elementary school, I think that our being objective skills were blunted and we were standardized.

PT14 thinks about this issue as follows:

Table 7. Findings regarding the prospective Turkish teachers' views on how they develop their students' critical thinking abilities.

	f	%
I will set an elite platform in the classroom and allow students express their opinions freely and let them participate	14	31,1
I will value their ideas	5	11,1
I didn't have this kind of education, so I don't take any tacks	2	4,5
I will contribute them to learn by experiences	7	15,5
I will set an example for them with my behaviors	5	11,1
I will guide them to think and help them to learn different mentalities	12	26,7
Total	45	100

As a result of the impressions which I received from the teachers, I think the education I was given is useful.

The question of "What methods will you follow to improve your students' critical thinking abilities when you become a teacher?" was asked to the prospective Turkish teachers and their answers were grouped and then the created sub-themes are presented in Table 7.

Prospective Turkish teachers who think that they didn't have an adequate education regarding to develop critical thinking do not want their students to grow up as themselves. For this reason, they say that they will not try different ways, but 26.7% of them would like to organize different activities such as cinema, theather, excursion, book launch, panel discussions, and forums, etc. Their suggestions are good and constructive. Excluding 2 students, no body has been declared negative ideas.

PT15 expresses what way he will follow in order to improve his/her students' criticism skills as:

I would like my students to feel comfortable in the classroom, and I will do my best to provide it. If my students are in the state of anxiety and fear, they won't feel comfortable themselves and i do not think that they can develop their ability of criticism. I am thinking of drawing a road map to provide a free environment for them to develop different perspectives and unlimited thinking as well as getting opinions from them about it.

PT16 mentions his/her views as follows:

By asking questions which can attract the attention of my students and listening to all of their evaluations equally without suppressing them and providing the opportunity to express themselves, I will improve these abilities of them. I will propose them to reach any sources, such as; Omar Khayyam, Rumi, Freud, Karl Marx, and Sezai Karakoc, etc. I will have them respect all kinds of opinion, faith, and manner of life.

DISCUSSION AND CONCLUSION

In the study, the answer to the question of "what are the

Turkish teachers' point of views about criticism?" has been sought and teachers have made the definition of criticism correctly with the portion of 73%. The other portion of 27% have described criticism as reporting only negative ideas. The 15% of them have limited it with comment, opinion and evaluation.

In the study, different opinions on being open to criticism are noteworthy. General conclusion is toward being respectful, understanding and tolerant and improving oneself. There are some others who state it as "to be able to stand to hear the negative sides and not to react them, to know not to be perfect, and to be open to comments". As it is seen, the answers are different, but what is desired to be expressed is very close to each other. To be open to criticism is an important feature in terms of prospective teachers' personal development. The majority of prospective teachers (84%) are completely and partially open to criticism.

The proportion of prospective teachers who said not to get excited while talking in public is 31%. Besides, the portion of the ones who get excited and get partially excited is 69%. The rate of those who get excited for the fear of being criticized in this ratio is 18%.

Since this research has been prepared to determine the critical perception of prospective teachers, and to see their perspectives on criticism and critical thinking, their opinions were given close attention and consideration. This is how the study differs from other similar studies.

There are many studies done regarding the critical thinking skills of prospective teachers (Kurum, 2002; Turnuklu and Yesildere, 2005; Ozdemir, 2005; Cubukcu, 2006; Akar, 2007; Gulveren, 2007; Cetin, 2008; Dutoglu and Tuncel, 2008; Zayif, 2008; Sacli and Demirhan, 2008; Sen, 2009; Ekinci and Aybek, 2010; Besoluk and Onder, 2010; Cetinkaya, 2011; Cekin, 2013; Yuksel et al., 2013; Can and Kaymakci, 2015; Kocak et al., 2015). These works are studies designed to measure critical thinking skills. Prospective teachers' critical thinking skills were determined to be at a lower level in some of these studies, and at an average level in other studies. In the survey conducted for religion teachers, this level increased to a high level (Cekin, 2013). In the light of these data, it can be concluded that teachers' education is not sufficient for developing their critical thinking skills. The participant teachers also gave the answers

confirming this idea. 75% of prospective teachers stated that their pre-university and university education were not enough to develop their critical thinking skills, and they did not get adequate training in this regard. The ratio of those who think that their education is useful and partially useful is 18%, and the rate of those who think that university education is useful is 7%.

While prospective Turkish teachers think that their education did not make any contributions in developing their critical thinking skills, they don't seem to have developed any methods about how they will improve their students' these skills in the future. Propsective teachers have some ideas for it, but these ideas have not been presented them under a method title or in a course curriculum. These ideas they expressed are their personal reviews in accordance with their inferences from their experiences. In general, they are open to critical thinking; but they still feel uncomfortable for being criticized. This represents a contrast. And this contrast makes difficult to predict how free, how tolerant and how understanding environment the prospective teachers can give in their classes when they become teachers in the future.

RECOMMENDATIONS

In the expectation that this study will be contributive to the field, some advices can be given. Students should be confronted with different and accurate examples of the criticism genre.

Thus, students can learn how to criticize from the texts in their course books and the tolerant lesson environments their teachers prepared instead of the inaccurate satirical expressions on television programs. Today, the perception of criticism has begun to change. Individuals who do not have accurate information in this regard will consider the competition programs and watch the competitors how they satirise each other and then think that s/he will have the right of vilifying and humiliating someone else. These presumptions and thoughts will confront us as the traces of going towards a civilization in which there is a social collapse and living together with intolerant people are forced and unrest and fighting arise every day. In order to avoid such a situation, students should meet correct techniques and methods of criticism in both Turkish courses and other courses, and must learn what critisim is in an accurate way. Prospective teachers who will shape the future should be provided a curriculum and an environment where they can fulfill their objectives.

From this perspective, the 2006 Turkish course curriculum which was prepared by a constructivist approach and currently being used, is a program that develops critical thinking skills of students, and enables a free and tolerant education. Teachers and students should be able to lecture in an open-minded environment, and be able to provide their comments and suggestions easily. But, of course, a curriculum is not enough to develop these skills by itself. The texts which have an important place in Turkish courses must also be prepared in accordance with it.

Conflict of Interests

The author has not declared any conflict of interests.

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Full Length Research Paper

Examining the permanence of the effect of an empathy program for the acquisition of empathy skills on gifted adolescents

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This study aimed to examine the permanence of the effect of an Empathy Training Program, administered 8 months ago on gifted adolescents studying in 6th and 7th grades. The sample of this study consisted of 60 students with IQ scores of above 130 and studied in Enderun Gifted Children Center. Bryant's Empathy Scale for Children was administered to these students. Then, 16 students whose empathy scores were below 10 were chosen. These students were randomly separated into experimental and control groups. Pretest and posttest control group design was used and the follow-up study was administered 8 months later. Mann-Whitney U test and Wilcoxon test were used to analyze. As a result of the analyses conducted to test the permanence of the effect of an applied training program, which was administered as the second stage of the study. There was a small increase in empathy scores of both groups, but there was a little more increase in scores of experimental group. However, as it was expected, this increase was not in a significant level. In conclusion, according to the obtained results, it was seen that the effect of an empathy-training program on gifted adolescents with low empathy scores was still permanent and this indicates that the applied empathy-training program is an effective and permanent study.

Key words: Gifted children, empathy skills, empathy program.

INTRODUCTION

Psychological science has become more acceptable and a popular science in recent years and, some concepts in this science have become widespread. One of those concepts, maybe the most common one is empathy. Most of us might have witnessed the demand of empathy of one person to the other in any conflict or deadlock. In fact, the most outstanding reason of this demand is the desire and the need of the person for being understood.

The desire for being understood may appear both in this kind of problem cases and situations originating from being minority in the society (for example; disabled groups, ethnic minority, gifted individuals). Individuals with gifted intelligence and high talents represent one of the groups that need empathic understanding. The concept of empathy is evaluated as an important term for understanding this and this kind of group members

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completely and accurately.

Empathy is the skill of entering into another individual's life, which may be defined as being able to see the connections underlying behavior, emotion, and thoughts that occur during interaction, and understanding what the person is going through (Ivey and Morgan, 1997).

As Barnett (1990) said, some authors and researchers (Borke, 1971; Buckley et al., 1979; Greenspan et al., 1976) define empathy as a cognitive skill enabling an individual to understand another individual's emotions and thoughts. People with opposing views (Batson and Coke, 1981; Feshbach, 1978; Hoffman, 1982; Sawin, 1979; Staub, 1978, Stotland, 1969) define empathy as experiencing an emotion similarly without identifying with the emotion of the other individual. This conceptual conflict arises from these two views about empathy. The key issue in this conflict is whether empathy is affective or cognitive and in what degree. In fact, saying that empathy includes both affective and cognitive elements would not be wrong.

By taking Rogers as a reference, Dokmen (1994) defines empathy as "by putting oneself in other person's shoes, it is the process of understanding and feeling the emotions and thoughts of an individual correctly, and transferring this situation to the person."

Voltan-Acar (1998) stated that empathy is the skill of perceiving and understanding expression and density of others' feelings.

According to the three-part model of Feschbach (1978), empathic reaction requires following three conditions:

1. The ability of detecting and recognizing other emotional situations
2. Ability to capture the role and perspective of the other
3. Evoking shared emotion and event

When we examine all of these definitions, we understand that the concept of empathy must be an inseparable part of interpersonal relationships, and development of this skill will increase social and communal adaptation. Especially, as we stated before, it will be seen that empathy is a facilitator factor both in daily relationships and in adaptation of minority groups to the society.

Freeman (1985) defined genius as the competence of exhibition of the strengths in the highest level in the activities of any specific area. While at first this concept was used for children who were extraordinarily successful, later it became a definition considered appropriate for children who have an IQ score ranked in percentile of two standard deviation from the mean. World Health Organization defines individuals who have 130 and more IQ score as "Gifted" (Uzun, 2004). Sears states that gifted children tend to be gifted adolescents socially, physically and academically; they are healthier, and they have a higher chance to enter university, make professional career and make a happy marriage (Sdorow, 1990). According to Renzulli (1978, 180-181), the

definition of giftedness cannot be explained with only one criterion, because giftedness is comprised three clusters connected to each other. These compounds are above average ability, commitment to duty and creativity. For giftedness, interaction of these three characteristics is required and each characteristic has equal contribution in this interaction.

As Silverman (1997, pp. 50-54) cites, giftedness is an asynchronous development in which increased density and advanced cognitive ability come together and qualitatively create a deviant awareness and internal experience. This asynchrony condition increases with high intellectual capacity (The Columbus Group, 1991). Asynchronous developments are cognitive, physical, emotional, and social developments that reveal themselves in different ratios in serious levels. In such a case, the child may not be emotionally ready to cope with the increased awareness that occurs because of advanced cognitive development (Hollingworth, 1931 & Morelock, 1992). The child may be a misfit with his or her peers socially, educationally and culturally (Terrassier, 1985). It is thought that this asynchrony condition affects empathic developments of some gifted children negatively.

Furthermore, studies conducted on gifted individuals show that gifted children experiences emotional problems as other children do. There are two situations that may cause problem for gifted children: First, they are not being challenged enough and so they get bored, and the second is the danger of social exclusion due to not being understood (Jost, 2006). In this situation, our observations about gifted children make us think that especially the problems they experience socially arise since adequate empathy cannot be established with them. Especially, when parents cannot realize that their child is gifted, they remain inadequate in understanding their children, and in developing empathy for them. And for this reason, since no empathy is developed for these children, gifted children cannot learn how to develop empathy and they have difficulty in developing empathy for others too. From this point forth, the purpose of the first study was to investigate whether applied empathy training program was effective in increasing empathy skills of gifted children who could not develop adequate empathy skills because they were not understood adequately or at least since it was late for them to be understood. And in this follow-up study, it was aimed to examine the permanence of this effectiveness.

While intelligence was mostly perceived as the ability to perform cognitive activities until Gardner's *Multiple Intelligences Model,* we realized that there might be other competency areas apart from cognitive activities.

This situation led to significant developments in the sense of evaluating intelligences, and correspondingly explaining high intelligence and giftedness. Besides, the concept of emotional intelligence carried Gardner's Multiple Intelligence Model one step forward. Even though the emotional intelligence concept was not included in the

scope of the present study, the reason of our emphasis on this concept will be understood when it is considered that empathy skill is one of the components of emotional intelligence. Goleman stated sub-areas that form social consciousness compounds of emotional intelligence are empathy, organizational consciousness and sense of service.

The individual who has empathic understanding will become aware of other people's points of views. This awareness will enable this person to understand and respect other people by placing himself or herself in other people's own realities (Deniz and Yilmaz, 2006, pp. 34-42). As Yilmaz (2003, pp. 56-59) transfers from Kalliopusko, study findings that compared the personality characteristics of adults whose empathy levels were high or low indicated that individuals with high levels of empathy had positive personality characteristics. It was found that individuals who had high empathy skills were affectionate, tolerant, and accepting themselves as they were. Moreover, it was discovered that people whose empathy skills were high had positive spiritual development and high self-esteem. Furthermore, it was stated that personal and social adaptation of children whose empathy skills were high was more positive compared to children with low empathy skills.

In Turkey, there are few studies which apply training program for developing empathy skills (Gemci, 2012; Sortullu, 2011; Yilmaz, 2003, pp. 98-105), and in these studies it was found that applied training programs increased empathy scores. Sahin and Akbaba (2010) investigated the effect of an empathy-training program on bullying in children and they observed that the program decreased their bullying levels. Empathy in gifted children (Akkan, 2012, pp. 20-28) was investigated in a comparative study that was conducted on 6-8 grade students; and their empathic orientation, life-satisfaction and their family lives were investigated according to their socio-metric status in two different academic environments. It was found that empathy levels of the students in acceptable status were higher. Another study (Uyaroglu, 2011, pp. 34-36) was conducted with gifted and normal primary school students to investigate the relationship between empathy skills and emotional intelligence of the students and their parents' attitude. It was found that as democratic attitude scores increased in mothers, empathy score increased in normal children;, however, as democratic attitude increased, empathy score decreased in gifted children. It is interesting that while democratic attitudes of mothers increased empathy scores of normal children, it decreased empathy scores of gifted children. Furthermore, in another study by Koksal (2007, pp. 62-69) a program was developed to increase emotional intelligence of gifted children, and in this study it was found that an emotional intelligence training program which was developed for gifted children increased their emotional intelligence levels.

Feshbach (1984) prepared an empathy program with the purpose of encouraging positive social behavior by organizing aggression behavior of primary school students. Moreover, in another study Feshbach (1978) investigated the correlation between empathy and four emotion states. These emotions were happiness, sadness, aggression and fear. In this study, it was found that empathy was mostly correlated with happiness, then sadness, and then aggressiveness and fear. In articles conducted abroad, empathy was mostly discussed with aggressiveness or bullying. While Lovett and Sheffield (2007, pp. 1-13) could not find a consistent relationship between empathy and aggression in children, they found a negative relationship in adolescents. In studies conducted by Bjorkqvist and Osterman (2000, pp. 191-200), it was seen that empathy decreased aggressive behaviors, and also there was a relationship between empathy and social intelligence. Jolliffe and Farrington (2011, pp. 59-71) found a relationship between low empathy and bullying in males, but they could not find a relationship in females. However, they detected a relationship between impulsivity and bullying in both males and females. In a study they conducted, Castillo, Salguero, Fernández-Berrocal and Balluerka, (2013, pp. 883-892) applied a program based on an emotional intelligence model with 590 adolescents who study in Spanish state schools and they found that the empathy scores of adolescents increased and their physical/verbal aggressiveness, anger, hostility, and personal conflicts decreased.

It is seen that most of the studies conducted abroad were based on Dabrowski's Overexcitabilities theory. The concept of empathy was included in these studies because it was one of the sub-headings of this theory. Dabrowski was one of the important individuals conducting studies on giftedness. As Ackerman (1997, pp. 125-143) said, Dabrowski structured his theory by observing his consultants who were artists, writers, gifted children and adolescents. His Overexcitabilities concept enabled us to understand gifted and highly talented children better. Dabrowski proposed that personal experiences had an effective role in development of their own excitabilities and he defined five different Overexcitabilities areas. These were; physical, sensorial, imaginative, intellectual, and emotional sensitivities. According to Dabrowski, these overexcitabilities enabled gifted individuals to make more sophisticated contact with the world. Dabrowski defined these five overexcitabilities in his "Positive Disintegration" theory as a part of high level of development. These overexcitabilities caused an energy overflow which might end up with advanced emotional and ethical development, and creative studies. Overexcitabilities was a genetic predisposition in the nervous system that responded to the stimuli more intensively, and since these sensitivities had the characteristics of empowerment, enrichment, fostering and increasing abilities, experiences were lived more intensely than usual (Tolan, 1999). As Tillier (1999)

conveyed, the fifth stage or level of Dabrowski's theory only included creative expressions and high talents. Those who reached this stage were the individuals who had a deep empathy and understanding. Bailey (2010) stated that in the fifth stage, individuals reached their ideal personality by having personal experiences and being at peace with themselves. With this stage, low motivation disappeared and superseded with higher forms of empathy, autonomy, and originality.

In another study conducted abroad, Lovecky (1992) emphasized discovering social and emotional aspects of giftedness in children. Longitudinal studies were conducted on life-satisfaction in gifted children. As a result of the studies, it was found that the gifted children with the highest life satisfaction were those whose parents encouraged them to learn how to develop empathy, and also the parents themselves who developed empathy for their children.

Briefly, in studies conducted in Turkey, it was seen that empathy training program was not applied on gifted children; only correlation or comparative studies were conducted with gifted children. So, applying a training program for developing empathy skills will be realized with the study for the first time.

The importance of empathy as a concept for interpersonal relationships cannot be denied. In a relationship, if the people can develop empathy for each other, that relationship becomes more easily friendship. Empathy is even more important for gifted children who are very likely to be misunderstood by their environment. As we stated before, it becomes difficult for gifted children to develop empathy since the people around them cannot develop empathy for them. Most of the researches state that it is important for gifted children to come together with children similar to them because these gatherings enable them to understand each other, which leads to a decrease in feelings of loneliness of gifted children. Moreover, for these children, these gatherings are beneficial for learning to develop empathy and to understand other people. As mentioned above, there is no study conducted on increasing empathy skills of gifted children in Turkey, and to fill this gap in this area, this kind of study and research is needed. Furthermore, in Turkey, there are no adequate number of studies about gifted or highly talented children, and no project has been developed for these children. It is thought that this type of study will contribute to the gifted children education.

Aim of the first study

The first study aimed at administering an empathy-training program for gifted children with low empathy scores, and to test if their empathy skills improved.

Aim of the follow-up study

This study aimed at testing the permanence of the effect of an empathy training program which was previously administered 8 months ago to the gifted adolescents with low empathy scores.

Hypotheses of the first study

Within the scope of the first study, four hypotheses below were tested.

1. There will be no significant difference between the pretest scores of the experimental group and control group.
2. There will be a significant difference between the posttest scores of the experimental group and control group.
3. There will be a significant difference between the pretest and posttest scores of the experimental group.
4. There will be no significant difference between the pretest and posttest scores of the control group.

Hypotheses of the follow-up study

Within the scope of this study, three hypotheses were examined.

1. There will be a significant difference between the follow-up test scores of the experimental group and control group.
2. There will be no significant difference between the posttest and follow-up test scores of the experimental group.
3. There will be no significant difference between the posttest and follow-up test scores of the control group.

METHOD

Research design

This research design is an experimental study seeking to determine the effect and the permanence of an empathy skills training program on 6th and 7th grade gifted students. Bryant's Empathy Scale for Children, which was adapted to Turkish by Yuksel (2003) was administered to the students. Then, 16 students with empathy scores were below 10 were chosen, and these students were randomly separated into two as experimental and control groups. In this study, a pretest and posttest control group design was used. The Empathy Training Program, prepared by the researchers, was conducted with the experimental group once a week, for eight weeks. Each session lasted about two hours. No treatment was given to the control group. After the first study, a follow-up study was conducted after 8 months, and the difference between posttest and follow-up test scores were analyzed. The independent variable of the study was the empathy training program, and the dependent variable was the empathy levels of the students.

Participants

The study group comprised 11-13 year-old students studying in 6th

and 7th grades attending the Enderun Gifted Children Center, which served under the Bagcilar Municipality. The sample was formed as the result of this procedure: "Empathy Scale for Children" adapted into Turkish by Yilmaz (2003) was administered to 60 students with IQ scores of above 130 and who studied in the Enderun center. Then students were ranked according to their scores, the names of the 16 students with lowest scores were put in a bag and 8 of them were randomly selected as the experimental and the other 8 as the control group. The lowest score for the test was set as 10 and lower by taking reference of Yilmaz's (the translator and adaptor of the scale into Turkish) own administration mean, which was 10.30 for the experimental group; 10.40 for the control group.

Data collection tool

Bryant (2003)'s "Empathy Scale for Children and Adolescents", adapted into Turkish by Yilmaz (2003), was used to measure empathy levels of the gifted children.

Empathy scale for children

The Empathy Scale for Children and Adolescents, developed by Bryant in 1982, adapted to Turkish by Yilmaz in 2003, was used. The internal consistency of the scale was .54 for first grades, .68 for fourth grades, and .79 for seventh grades. Its validity was done by comparing the scores of the first graders received from the scale to the scores they received from the Feschbach and Roe's (1968) Empathy Scale; a significant relationship was found at the level of .05. Furthermore, the scores of seventh graders received from the scale were compared to the scores they received from Mehrabian and Epstain's scale, and a significant correlation was found at the level of .001 (Yilmaz, 2003). The validity of the scale in Turkey was calculated with internal consistency coefficient and test-retest technique. Cronbach Alpha Coefficient was calculated through the scores obtained from the tests administered to 237 students in three primary schools found as .70. In test-retest method, the test was administered to the 89 students twice with 15 days interval, and the relationship between the obtained scores was calculated by Pearson Product-Moment Correlation Coefficient and found as r=.694 (p<.001) (Yilmaz, A., 2003). For testing validity, the test, which was administered to 237 students, was subjected to factor analysis with SPSS, Principal component analysis was made on the scale consisting of 22 items and single factorial solution was searched. It was found that factor loading of the items was gathered around the first factor. According to this, items with .245 and more factor loading were selected. Since factor loading of two items were below .245, these two items were discarded. In this form, the scale consisted of 20 items (Yilmaz, 2003).

Empathy training program

The development of the Empathy Training Program, benefited from the work of Morganett (2005), Erkan and Kaya (2005) and Altinay which included activity samples in group counseling. The program was prepared by the researcher by selecting cognitive therapy and reality therapy techniques as the baseline, which included the processes like informative talking and sharing, raising awareness, and changing false emotion and thinking patterns. Throughout the study, the purpose was to get the students in touch with their emotions with techniques like informing them about empathy, increasing their awareness about this subject, practical applications about understanding the feelings of the other person, competitions, inter-group discussions and evaluations, and sharing their memories.

FINDINGS AND ANALYSIS

The first study was an experimental design study comprising experimental and control groups, using pretest and posttest design. The group consisted of 16 people randomly divided into two groups: experimental and control groups. 8 weeks training, which involved a semi-structured group therapy work was administered to the experimental group, and no treatment was given to the control group. Pretest and posttest were administerd to both groups, one at the beginning of the training, and the other at the end of 8 weeks. In the second part of the study which was a follow-up study, the test was read ministered to the same students, and posttest scores of the previous study and test scores of the follow-up study were statistically analyzed. The results of the both tests were calculated with SPSS 20 program. Since the size of our sample was small, instead of t-test, we used Mann-Whitney U and Wilcoxon Signed-Rank Test, which is a nonparametric test. Findings acquired as a result of the analyses are included respectively; first the results of the previous study, and then the results of the follow-up study.

Findings and interpretation of the first study

Firstly, mean and standard deviations of the scores of the students in the experimental and control groups from pretest and posttest are included in Table 1.

In Table 1, while there was a significant increase in the pretest and posttest scores of the students in the experimental group (from 7,62 to 12,37), there was only a small difference between the pretest and posttest scores of the students in the control group (from 9,37 to 10,12).

In order to see if inter-group differences and intra-group differences affected data in a significant level, the Mann-Whitney U test was used for inter-group difference, and the Wilcoxon Signed-Rank Test was used for intra-group difference. Comparison of the pretest scores of the experimental and control groups are depicted in Table 2.

When the comparison of the pretest scores of two groups are analyzed, it can be said that even though the students were randomly selected, the empathy scale scores of the students selected for the experimental group show a lower inclination compared to the control group. As expected statistically, there is a homogeneous structure between the two groups, that is, there is no significant difference between the two groups (Z= -1.94, p= 0.52 and p>.05).

Results about comparison of the posttest scores of the two groups according to Mann-Whitney U test are depicted in Table 3.

When Table 3 is analyzed, it is seen that there is no significant difference between the posttest scores of the experimental and the control groups as it was in the pretest scores (Z= -1.626, p=0.10 and p> .05). Even

Table 1. Arithmetic average and standard deviation of the empathy scale pretest and posttest scores of the experimental and control groups.

Group	Pretest			Posttest		
	N	$\overline{X}$	SS	N	$\overline{X}$	SS
Experimental	8	7,62	1,84	8	12,37	3,38
Control	8	9,37	1,06	8	10,12	0,35

Table 2. Comparison the pretest scores of the students in the experimental and control groups.

Group	N	Ranking average	Ranking sum	U	Z	P
Experimental	8	5,88	47,00	14,50	-1,94	0,52
Control	8	11,13	89,00			

Table 3. Comparison of the posttest scores of the students in the experimental and control groups.

Group	Pretest			Posttest		
	N	$\overline{X}$	SS	N	$\overline{X}$	SS
Experimental	8	7,62	1,84	8	12,37	3,38
Control	8	9,37	1,06	8	10,12	0,35

Table 4. The difference between pretest and posttest scores of the experimental and control groups.

Group	Pretest			Posttest		
	N	$\overline{X}$	SS	N	$\overline{X}$	SS
Experimental	8	7,62	1,84	8	12,37	3,38
Control	8	9,37	1,06	8	10,12	0,35

though the experimental group showed a significant increase within itself, mean of the experimental group was smaller since the experimental group was randomly formed of the students with lower scores while separating the sample into two as the experimental and control groups. So, since the scores of the experimental group have increased within itself, and in parallel with this, there has been no difference in the control group's scores, test scores of the experimental and control groups have got closer to each other, and thus, no significant difference has occurred between the two groups. However, because the main objective of this study was to have an increase in low empathy scores of the gifted students at the end of the empathy training program, the most important statistical result with regard to the present study is the point if there has been any significant difference between the pretest and posttest scores of the experimental and

control groups. For this reason, we need to evaluate the results of Wilcoxon Signed-Rank test.

As it is in the Table 4, while there has been a significant difference in the pretest and posttest scores of the experimental group (Z= -2.52, p=0.01 and p<.05), no significant difference has been found between the pretest and posttest scores of the control group (Z= -1.89, p= 0.59 and p> .05). As a result, findings indicate that the empathy-training program led to a significant increase in low empathy scores of the gifted students.

Findings and interpretation of the follow-up study

Firstly, mean and standard deviations of the scores students in the experimental and control groups obtained at the end of the empathy training program and from the follow- up test, which was administered 8 months later, are included in Table 5.

As seen in Table 5, there is a small difference between the posttest and follow-up test scores of the students in the experimental group in favor of the follow-up test scores (from 12,37 to 12,87), and similarly, a small difference was found between the posttest and follow-up test scores of the students in the control group in favor of the follow-up test scores (from 10,12 to 10,25). These results indicate that the effect of empathy training program is permanent, because there has been no decrease in the empathy scores of the students in the experimental group despite the time interval, and even there was a small increase.

Results on t the comparison of the follow-up test scores of the two groups according to the Mann-Whitney U test are included in Table 6.

When Table 6 is examined it is seen that the follow-up test scores are meaningful at confidence level of .10, similar to the posttest results (Z= -1.65, p= 0.09 and p>.05). Since no other variables other than time interval

Table 5. Arithmetic average and standard deviation of the empathy scale posttest and follow-up test scores of experimental and control groups.

Group	Pretest			Posttest		
	N	$\overline{X}$	SS	N	$\overline{X}$	SS
Experimental	8	7,62	1,84	8	12,37	3,38
Control	8	9,37	1,06	8	10,12	0,35

Table 6. Comparison of the follow-up test scores of the students in experimental and control groups.

Group	Pretest			Posttest		
	N	$\overline{X}$	SS	N	$\overline{X}$	SS
Experimental	8	7,62	1,84	8	12,37	3,38
Control	8	9,37	1,06	8	10,12	0,35

has changed in the follow-up study, the result in the posttest scores is replicated as expected.

Finally, the Wilcoxon Signed-Rank Test was administered to test if there was a difference between the posttest and the follow-up test scores of the experimental and control groups within themselves. Table 7 includes the results of both the experimental and control groups.

When Table 7 is examined it is seen that there was no significant difference between the posttest and follow-up test scores of the experimental group (Z= -1.30, p=0.19 and p>.05), and similarly, no significant difference was found between the posttest and follow-up test scores of the control group. As a result, obtained findings indicate that the effect of an empathy training program on the gifted students is still permanent. This indcates that applied empathy-training program was an effective study. Moreover, the fact that there was an increase in the empathy scores, though it was small, shows that the applied empathy program has a long-term effect and it implies that it is important to investigate if the empathy skills of gifted children can be developed with similar studies designed to develop empathy skills.

DISCUSSION

This study was carried out based on the consideration that in some gifted children emotional development may fall behind cognitive development, and thus gifted children may have difficulty in their daily interactions. In this sense, in the first study, we aimed at conducting a study both for identifying the empathy levels of the gifted children and also for testing if empathy skill which is seen as a part of emotional development can be developed through an applied empathy program administered to these students. Secondly, the effectiveness of an applied

empathy training program was examined with a follow-up study 8 months later. First hypotheses formed as a part of the study were tested by using Mann-Whitney U and Wilcoxon Signed-Rank test. According to Mann-Whitney U test, the hypothesis claiming that there will be no significant difference between the pretest scores of the experimental and control groups was confirmed (Table 2), but the hypothesis claiming that there will be a significant difference between posttest scores of the experimental and control groups was not confirmed (Table 3). As stated in the findings, since the empathy scores of the experimental group were lower than the control group by chance, increase in the scores of the experimental group could not reach a point to make a difference between the two groups (Table 1). Moreover, although no training program was administered to the control group, scores of the control group increased a little as well. This result may stem from the fact that these students come together in the same institution on determined days of the week and they are in touch all the time. However, increase in the scores of the experimental group is significantly higher and this result was also supported with Wilcoxon Signed-Rank Test. The other two hypotheses analyzed by the Wilcoxon Signed-Rank test; there will be significant difference between the pretest and posttest scores of the experimental group, and there will be no significant difference between the pretest and posttest scores of the control group" were confirmed (Table 4). In other words, a significant increase occurred in the posttest scores of the experimental group, and no significant difference occurred in the posttest scores of the control group. When this situation is taken into consideration, it can be said that an applied empathy psycho-training program positively affected the empathy skills of the students in the experimental group positively. The effect of a psycho-training program may be seen as an expected result in consequence of performed applications. That is, throughout the applications, it was ensured that the students gained awareness of their emotions, both their own and others; making connections with their emotions and thoughts, maintaining the awareness gained in the group with homework, performing "here-and-now" learnings with plays and competitions in the group, encountering with their various emotions through the dynamic nature of group activities, and experiencing these emotions within the group. Naturally, all of these processes contributed to an increase in empathy skills of the students.

When related literature was examined, there were studies indicating an increase in empathy scores as a result of empathy training programs (Gemci, 2012; Sortullu, 2011; Yilmaz, 2003), similar to the findings of the present study. In another study which aimed at increasing empathy scores to decrease aggression (Castillo and others, 2013), it was observed that an applied training program increased empathy scores significantly. However, none of these studies were conducted with gifted children, so it can be said that the

Table 7. The difference between posttest and follow-up test scores of experimental and control groups.

Group	Tests	N	$\bar{X}$	SS	Z	P
Experimental	Posttest	8	12,37	3,38	-1,30	0,19
	Follow-up Test	8	12,87	3,52		
Control	Posttest	8	10,12	0,35	-0,57	0,56
	Follow-up Test	8	10,25	1,16		

present study is a pioneer study.

Furthermore, the nature of the study, open to group interaction, provides knowledge about gifted children. In this study a parallel situation with Dabrowski's "overexcitability" theory was observed. While conducting the posttest, the students recognized this test and made predictions about why this test was re-administered and showed a sensibility and resistance since they understood that their possible change was being evaluated. A student expressed this resistance and sensibility explicitly by saying, "I have learned a lot here, but I will not change my answers." The fact that the posttest scores of two students who did not participate in the last session and took the test later were notably higher than their friends confirms this sensibility. In other words, these children knew very well how to react, but they perceived themselves as experimental subjects and showed a resistance to exhibit their own reactions. In spite of the students' thoughts and interpretations, there were changes in their answers; however, if such a resistance had not been present, results would have been much higher. Moreover, male students in the group did not give their answers as they really felt and made a reduction by showing reasons like "Men do not cry". However, when the applied test items to which children responded as "Men do not cry" were analyzed thoroughly, it was seen that it was a point that needs to be emphasized. When test items are examined comprehensively, empathy is mostly evaluated by focusing on only one direction like crying and filling with tears, and so the test does not have adequate emotional richness variety to identify empathy. Therefore, with this study, it can also be stated that the test needs to be re-evaluated in this sense. The interpretation of the students concerning the test is important since it indicates that when studying with gifted children you will also learn something while teaching.

The second study was planned as a follow-up study to determine the permanence of the effect of a psycho-training program, which was applied to develop empathy skills of gifted students.

Hypotheses of the study were tested by using the Mann-Whitney U and Wilcoxon Signed-Rank tests. According to the Mann-Whitney U test, the hypothesis, there will be a significant difference between follow-up test scores of the ^ experimental group and the control groups was confirmed (Table 6). The other two hypotheses which were analyzed with the Wilcoxon Signed-Rank test. There will be no significant difference between posttest and follow-up test scores of the experimental group and there will be no significant difference between posttest and follow-up test scores of the control group were confirmed (Table 7). As a result, the increase in the posttest scores of the experimental group at the end of applied the empathy training program was still permanent in the follow-up test scores which were applied 8 months later, and there was a positive increase in the follow-up scores though small. It was seen that in spite of time interval, increase in the scores of the students in the experimental group, obtained at the end of the empathy training program, were still permanent. In the control group, there were small increases in the scores of both studies; however, the difference was not significant both between the pretest and posttest scores and between the posttest and follow-up test scores. As for the small increase in the empathy scores of the students in the control group, we can say that positive change in the scores of the experimental group might have influenced the scores of the students in the control group positively because the students come together in the same institution and they are always in touch with each other. Furthermore, it should be questioned if conducting other similar studies can carry developmental level of the experimental group a step forward. The follow-up study results of the experimental group does not indicate a decrease but it even shows a small increase, so this type of study should be supported.

In conclusion, according to the findings of the study, there is a significant increase in empathy skills of the experimental group compared to the control group. Therefore, it can be said that the applied empathy skills psycho-training program was effective in increasing empathy skills of the students in the experimental group. This result shows a consistency with other experimental studies conducted to develop empathy skills both in Turkey [Gemici, 2012; Sortullu, 2011; Yilmaz, 2003)] and abroad [Feshbach, 1984; Castillo et al., 2013]. Even though these studies were not conducted with gifted students, the consistency of the results with these studies once again indicates the benefit of group work in

developing empathy skills. Moreover, in the follow-up study, which was conducted 8 months later, it was found that the effect of the empathy training program on the experimental group was still permanent. This result obtained from a follow-up study is important for sharing the effect of the first study.

IMPLICATIONS

This study indicates that empathy-training programs aiming at developing empathy skills are effective for both gifted children and this age group. There was an increase in the empathy scores as a result of the training program which   implies that it would be useful providing these types of studies in school counseling centers. Applying this kind of studies in schools widely will contribute to the development of empathy skills and social intelligence of students in a positive way. Moreover, gifted children are viewed as the driving and developer force of society, the necessity of increasing this type of study with such children will be understood, since the number of studies about gifted children is still inadequate in Turkey.

This study was conducted with gifted adolescent students; however, in order to test the effectiveness of the training program, it is important to replicate similar studies with different age groups and different samples. Furthermore, to be able to apply the empathy-training program to many groups, a "practitioner training program" could be formed to orient the training of experts with the competence of applying the program.

Conflict of Interests

The author has not declared any conflicts of interest.

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Full Length Research Paper

Development of learning management model based on constructivist theory and reasoning strategies for enhancing the critical thinking of secondary students

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The objectives of this research were to study issues around the management of science learning, problems that are encountered, and to develop a learning management model to address those problems. The development of that model and the findings of its study were based on Constructivist Theory and literature on reasoning strategies for enhancing critical thinking among secondary school students. In the demonstration project of the developed model, two classes of grade 9 students were selected. One class of 33 students and another of 30 students became the experimental and control groups, for instruction based on the learning management model (experimental), and the traditional approach (control). This research used a Research and Development methodology (R&D), which included three phases for implementation. The research findings found that the teachers who implemented the learning management model assessed its usefulness at a "moderate" level. In addition, they agreed about the need for such a model for enhancing critical thinking at "the highest" level. Evaluation of one of the models found it to be appropriate at "the highest" level and the effectiveness of the model conducted from post-tests of critical thinking ability scores was 76.30/77.47. The effectiveness score conducted from the perspective of academic achievement was 76.30/76.67. The students who participated in the experimental group obtained a higher score on the post-test on critical thinking ability at .05 level of significance. In addition, the experimental-group students obtained a higher level of post-test scores in both critical thinking and academic achievement than the control group at .05 level of significance.

Key words: Learning management model, constructivist theory, reasoning strategies, critical thinking.

INTRODUCTION

Critical thinking is an important feature of the educational development of children that should be developed continuously at every school level. In addition, it is widely seen as a necessary and important thinking process for

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every student at every age level. It is a cognitive skill that enables people to consider evidence or data that could be applied in various situations. Its importance has been supported by various sets of national criteria for evaluating the educational management of curricula. This can be seen in the separate criteria of the National Education Commission standards of analytical thinking, synthetic thinking, critical thinking, creative thinking, pondering, and vision (Office of National Education Commission, 2000: 1). Ennis (1985: 45-48) has explained critical thinking as a process that requires one to use one's knowledge as well as skill in making decisions in action. It is described as a kind of pondering with reason aimed to help one decide what should be believed or acted upon. It is a cognitive process that entails negotiation with reasons by using the evidence for ascertaining one's opinion in order to reach conclusions (Marzano, 1988: 121-125) as well as changes in one's viewpoint on the basis of evidence. Chantarachit (2013: 21) classifies it as a kind of logical thinking. Watson and Glaser' Critical Thinking Theory (1964: 2) stated that critical thinking consists of one's attitude, knowledge, and skill in different issues. They described five aspects of critical thinking ability: ability to conclude, awareness of basic assumptions, deduction, interpretation, and evaluation of premises premise or negotiation.

A review of the literature provided this researcher with perspectives and guidelines for presenting an approach for implementing a learning management model for enhancing critical thinking skills. The theoretical basis for this work includes Constructivist Theory, a process in which students construct knowledge by associating their experience or what they had seen in a new environment or via information technology, with their prior knowledge in order to construct their own understanding. This resulting understanding is called a cognitive structure (Piaget, 1985, cited in Parke and Gauvain 2009: 274-275), which can also be seen in Vygotsky's intellectual approach (1978, cited in Cohen et al. 2010: 63). These theoretical approaches have transformed teaching into a method for developing one's thinking via peer collaboration by sharing social interactions in social groups.

Considering the recent instructional situation in Thailand, the Thai educational system has consistently devalued critical thinking ability; most instructional processes in classrooms still emphasized knowledge to be fed by teachers and maintaining an uncritical deference to authority. The students learn by memorizing rather than thinking or reasoning (Sinlarat, 1992: 23). This criticism is congruent with evaluations by the Office of National Education Standard and Quality Assessment (Public Organization), which found that the students were very weak in analytical thinking, synthetic thinking, creative thinking, pondering, and vision, evaluated at the lowest "to be improved" standard. In conclusion, the students had very little ability in analysis, synthesis, critical thinking, or any other measurable form of creative thinking (Bureau of Academic Affairs and Educational

Standard, Ministry of Education, 2010:1). Lastly, the author chose to focus this project on science and science teachers to encourage the application of instructional strategies for fostering the student's critical thinking abilities. Since most Thai students at the secondary level indeed have quite low levels of critical thinking, and because these cognitive abilities are so essential in science, the learning strategy in this project was an opportunity to develop effective teaching in science.

According to the above reasons and its clear significance, the researcher developed the proposed model, named the Learning Management Model Based on Constructivist Theory. It employs reasoning strategies for enhancing the students' critical thinking by integrating it into the learning management process of the science curriculum, and was developed through a Research and Development process.

Research objectives

The following goals were established as the framework for this study:

1. To study the situation and problems in science learning management for enhancing secondary school students 'critical thinking;
2. To develop a learning management model based on constructivist theory and reasoning strategies for enhancing students' critical thinking;
3. To study the findings of use in a learning management model based on constructivist theory and reasoning strategies for enhancing students' critical thinking in the following issues;
a. The efficiency of in learning management model based on constructivist theory, and reasoning strategies for enhancing the students' critical thinking.
b. The comparison of students' critical thinking between pre-test and post-test by a learning management model for enhancing students' critical thinking.
c. The comparison of students' critical thinking between the experimental group who were taught via a learning management model based on constructivist theory and reasoning strategies, and the control group who were taught via a general method.

To study the impacts of the implementation of this Learning Management Model looking specifically at the following issues:

1. The effectiveness of the proposed Learning Management Model.
2. Comparison of pre-test and post-test scores of sampled students taking critical thinking tests after instruction in the proposed learning model.
3. Comparison of results between the experimental group and the control group in the acquisition of critical thinking

skills.

RESEARCH METHODOLOGY

This project consisted of three phases:

Phase 1 consisted of a survey of the literature, a study of the current situation, an analysis of the existing problems, and creating a statement of the need for an instructional model that will enhance the critical thinking abilities of secondary schools.

A population consisting of 70 secondary school science teachers and their students were selected to participate. In all, 3,010 students in grade 9 took part, during the second semester of the 2013 academic year. All of the schools were under the jurisdiction of the Office of Secondary Educational Service Area 24.

The samples were 35 Secondary School science teachers, selected by Simple Random Sampling, and the 105 grade 9 students of these teachers. The study took place during the second semester of 2013 academic year.

The research instruments were a questionnaire sent to the teachers and students, and semi-structured interviews with participating teachers and students.

Phase 2 is further divided into four steps,

1. The tentative curriculum was designed using the conceptual framework derived from the analysis of the situation, problems, and expressed needs of teachers. It was a theoretical synthesis of Constructivist Theory and the reasoning strategies model of Joyce, Weil and Calhoun (2004:85-101).
2. The tentative model was examined by seven experts taking part in a focus group discussion, from which the implemented instructional model was refined.
3. The final draft of the instructional model was further examined for its quality and propriety.
4. The instructional model was then tried out in a pilot study with 44 students in grade 9, during the second semester of 2013 academic year. Instruction took place over twelve weeks for two hours/week, totaling 24 hours of instruction.

Phase 3 looked at the findings from the usage of the instructional model. A comparison of student performance between the pre-test and post-test for their critical thinking skills was measured. Furthermore, scores for control and experimental groups were compared.

The total population of the sample was 255 grade 9 students. Of this total population, two classrooms were selected as the sample to take part in the instructional model during the first semester of the 2014 academic year. They were assigned into an experimental group of one classroom consisting of 33 students who received the instruction from the developed model, and a control group of one classroom consisting of 30 students who received customary instruction. They were selected by Cluster Random Sampling and the study followed Randomized Control Group Design (Taweerat, 1997: 40). The research instruments consisted of the model syllabus, a test of critical thinking skills, and a learning achievement test.

Data analysis

The researcher analyzed data by calculating the mean, percentage, and standard deviation. The effectiveness E1/E2 test was applied, and a comparison was calculated between pre-test and post-test by using t-tests for dependent samples (Srisaad, 2010:137), and Hotelling's T2 test for independent samples (Boonreungrat, 1997: 153).

RESEARCH FINDINGS

During Phase 1, it was found that the teachers provided information about the need for critical thinking education, and offered suggestions for the design of a Learning Management Model. They rated the current skill level at a "Moderate" level, and the need for this Learning Management Model at "the Highest" level.

Phase 2 produced an instructional model which consisted of the following components: 1) the basic rationale, approach, and theory; 2) the instructional objectives and learner outcomes of the model; 3) the steps of implementing instruction according to the developed model. This last component had five aspects: motivation, creation of understanding in various incidents or situations, associating the basic experience with previous understanding, considering and accepting the consensus through reference and negotiation, and the evaluation and assessment of performance practice, 4) the social system, 5) the principle of response, and 6) the support system.

Phase 3: findings from the implementation of the instructional model were as follows:

The Effectiveness of the model can be seen in Figure 1. According to Figure 1, it was found that the effectiveness of the learning management model was calculated by the Process Effectiveness formula, resulting in a score of 206 with an average of 157.15, and a percentage of 76.30%. The post-test critical thinking test score was 60 with an average of 46.48, resulted in an effectiveness score of 76.30/77.47. Furthermore, the effectiveness of the model, as calculated by the learning achievement test, was 76.30/76.67.

The comparison of critical thinking scores between pre-test and post-test

As can be seen in Table 1 and Figure 2, the students taught by the instructional model had average scores on the test in critical thinking (maximum score was 60) of 27.26, and the average post-test score was 46.48. This difference was at the .05 level of significant.

Comparison of the experimental group and the control group

According to Table 2 and Figure 3, the experimental group had a higher mean score on the post-test than the control group at .05 level of significance.

DISCUSSIONS OF RESEARCH FINDINGS

Since science is a critical a subject that requires experimentation and practice, it is also a subject most in need of adding the methodologies of critical thinking.
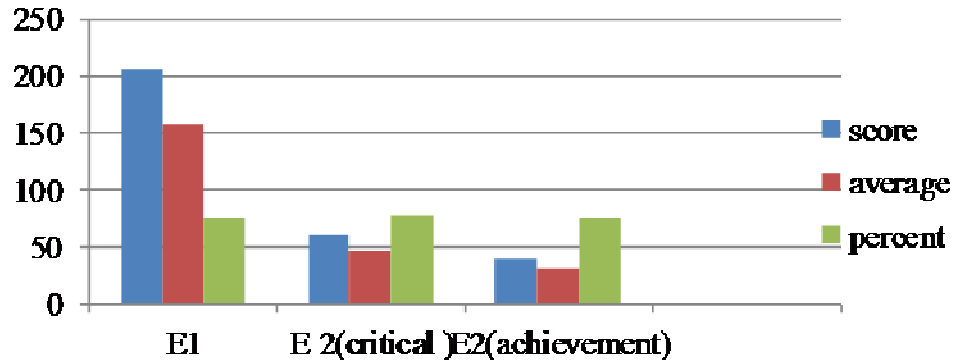
Figure 1. The Effectiveness of the instructional model as calculated by a comparison of pre-test and post-test scores and the achievement test.

Table 1. Means and standard deviations in pre-tests and post- tests.

Test score	Score	$\overline{x}$	S.D.	t	p
Pre-test	60	27.26	4.66	29.536*	.000
Post-test	60	46.48	4.48		

*at the .05 level of significance.
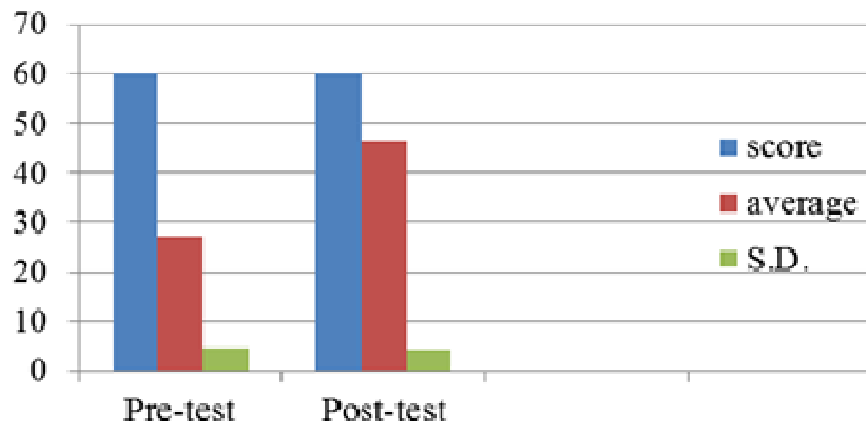
Figure 2. Comparative findings of pre-test and post-test scores in critical thinking.

Table 2. Means and standard deviations between the experimental group and control group

Post-test score	n	Score	$\overline{x}$	S.D.	t	p
Experimental group.	33	60	46.48	4.84	9.418*	.000
Control group.	30	60	34.43	5.32		

* at the .05 level of significance

Despite this, a seriously large number of teachers still teach using a teacher-centered method based on lectures and requiring their students to memorize rather than to learn the material through problem solving or empowering them to seek out knowledge by themselves. The findings in Phase 1 found that the sampled science teachers identified this problem at the "Highest" level ($\overline{x}$ = 4.58, S.D = 0.16) They also expressed that most of the
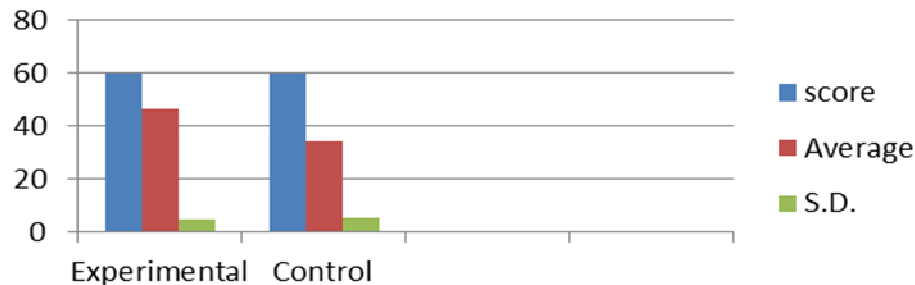
Figure 3. Comparative findings between the experimental group and the control group.

teachers didn't have sufficient knowledge to provide different ways to teach their subjects. As a result, they wanted the training for enhancing critical thinking among their students through the science curriculum so that their students could practice and apply these skills and use their reason from former experience in problem solving.

Interviews with science teachers and their students found that in science classes, most learning occurs in structured learning activities, experimentation, group presentations, and individual presentations based on guidelines of the Institute for the Promotion of Teaching Science and Technology (IPST, 2003:41). In this approach, all learning is controlled by teachers through lecturing. The students answered questions on work-sheets or knowledge sheets and they are not expected to use any other kinds of knowledge. The teachers concluded from these guidelines that knowledge can only be learned by students taking notes. The teaching could only focus on content because it had to be used for competitive testing as well as national testing. The students reported that sometimes experimentation activities couldn't be concluded on time. As a result, they often didn't pay attention to participate in these activities. In measurement and evaluation activities, the students didn't like to do work by themselves, and instead copied from their friends. Their reasons were that they were never taught how to think through the activity and thus could not do it. Most of teachers said that it was necessary to train students in the critical thinking process since it would help their students to think on their own by considering or pondering different situations through their prior experience, comparing good and weak points before making decisions, and selecting from reliable supportive reasons, and using their former experiences to be able to use the applied knowledge in their daily life

Phase 2 was investigated, based on the work of Joyce et al. (2004: 85-101) including: 1) basic theoretical approach, 2) objective, 3) steps for learning management, 4) social system, 5) principle of response, and 6) support system. In addition, the researcher had added five of learning management as follows:

a) Motivation, providing activities to stimulate the students' interest to be curious based on problem situations in the

lesson, to analyze the major material and factors in the situation by discussion and asking.
b) Comprehension: creating steps to help comprehension in the given incident and by association from basic experiences, providing a situation to be faced by students in order to develop their understanding and explanation for the factors as well as conditions by analysis associating it with prior knowledge and experience. Then, using conjecture, try to answer the problem, specify their understanding with reasons and which aspects of prior knowledge was reliable.
c) Hypothesis: outline the steps for examining the possible alternatives and searching for the answers by presenting the alternatives believed to be reliable and correct, and analyze these alternatives in searching of correct answers.
d) Pondering: by consensus through inference and negotiation, present and explain the issues of supportive and negotiated issues, and make decisions to either accept or reject a hypothesis.
e) Evaluation: judge the value or evaluate the practice performance, ascertain and support the conclusion and apply it in other situations.

In Phase 2, the focus group evaluation of the model found that there were 10 items of the assessment in their evaluation by using statistics value, the mean (4.61), and the Standard Deviation (S.D.) = 0.11. Every issue was appropriated in "the Highest" level.

Phase 3 found that the overall effectiveness of the Learning Management Model (E1/ E2) was 76.30/77.47. In addition, the effectiveness as calculated from the Learning Achievement Test was 76.30/76.67, meaning that the Process Effectiveness (E1) obtained from percentage of average value of the Learning Behavioral Evaluation, activity participation, and quiz after finishing the study in all three units, was 76.30. The Output Effectiveness (E2) obtained by percentage of the average scores from the critical thinking ability test after instruction was 77.47. Moreover, the Output Effectiveness (E2) obtained by percentage of average scores from the Learning Achievement Test after studying was 76.67. These results were supported by Jeremiah (2013: 171-A), who found that the most successful critical thinking

was to pay continuous attention to the teachers, and the most successful teaching was performed by assigning challenging work tasks, and providing advice in the form of guidelines for problem solving. Furthermore, these results were also supported by Steffen (2012:194-A), who found that critical thinking in the classroom needs to be persuasive and challenging for students' learning. The creation of a conducive environment would develop one's critical thinking as well as thinking ability. It is thus necessary for the school to add more content and teaching processes in critical thinking skills in the curriculum and lesson plans.

Students who were taught by the critical thinking model received post-test scores in the test of critical thinking ability that were significantly higher than the pre-test scores at a .05 level of significance. The pre-test mean score was 27.26, while the post-test mean score was 46.48 points. The instruction that these students experienced focused on five steps of critical thinking as informed by the above theoretical framework. This apparently had an effect on the development of the critical thinking skills of the participating students. These five steps included interpreting a situation, explanation and reference, considering and pondering the reliability of information, conjecture and analysis of negotiation, and evaluating alternatives of decision making and opinion. Key in the model's instruction was to promote the ability to consider, to judge, and to conclude based on available information. This teaching approach was supported by Thurman (2009:118-A), who integrated critical thinking into an English language learning curriculum. According to multiple research findings, the teaching strategy for critical thinking could affect one's learning in other areas. It was able to help to develop the students' thinking, and enhance the teaching process as well as giving the students more self- confidence in their own thoughts which would bring one's learning to a higher level.

The comparison of test results between the experimental group and the control group found that the experimental group obtained higher scores in the test of critical thinking ability than the control group at .a level of significance of .05. The average score of the experimental group was 46.48 and the control group was 34.43. Furthermore, the experimental group's post-test learning achievement was higher than the control group's at a .05 level of significance. The experimental group's average score was 30.67, while the control group's average score was 27.50. These results were supported by Burn (2010: 183-A), who conducted similar research at the primary level

Nevertheless, positive results of this research bring up some serious questions about the methodology. In this research, providing groups of students in the experimental class and subject contents used for this research may lead to inappropriate practices. For example, a group of students that was randomly assigned might already prefer learning with problem-solving and critical thinking.

The subject matter used in this model already uses a learning process that is intended to encourage the students to thinking critically. Thus, the subject matter itself can affect the results.

Conclusion

This study outlined an approach to teaching critical thinking. The objectives of this research were to enhance the critical thinking skills of secondary school students and to develop a learning management model that focuses on science content at the secondary school level. The findings of this study indicate that the learning management model that was constructed by the researcher was able to develop critical thinking abilities in the participating students. The success of this model was explained by its use of five steps for learning management that were synthesized from a variety of theoretical approaches and related literature in educational management. The teachers who participated were able to adapt the model to science content in other levels by focusing on the questions stimulating the students to think. Learning management emphasized participatory discussion and sharing of opinions, group working skills, choosing roles as leader or follower, critiquing, expression with logical opinion, listening to others' opinion and having the courage to express one's own opinion. Finally, we hope this research can point the way to future research in other subject content areas.

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

An analysis of the quality assurance policies in a Ghanian University

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The study examined the implementation challenges of quality assurance in public universities in Ghana with a focus on University for Development Studies (UDS). The study adopted a qualitative case study design. The data for the study was collected through in-depth interviews, document analysis and participants observation. The study revealed that the Directorate of Academic Quality Assurance (DAQA) undertakes many activities geared towards quality assurance and enhancement of quality in the University. The findings of the study suggest that UDS has taken pragmatic steps to assure quality in its operations. However, the implementation challenges of quality assurance include: staffing and offices; quality culture; physical and financial resources; commitment and support for quality assurance; and absence of a current strategic plan. The author recommends that as a multi-campus University, there should be staff and offices on each of the Campuses for effective coordination of quality assurance activities. The study concludes that the Directorate of the Academic Quality Assurance should be supported to develop a quality assurance culture in the University.

Key words: Quality assurance, challenges, establishment, directorate, university.

INTRODUCTION

Quality has become a very important issue in higher education institutions toward gaining competitive advantage in this changing and dynamic environment. Quality has been an implicit concern of higher education institutions since the establishment of the premier university in Ghana in 1948 and its subsequent elevation to autonomous status. Chacha (2002) therefore argues that universities all over the world are supposed to be characterized by quality and excellence, equity, responsiveness and effective and efficient provision of services, good governance and excellent management of resources.

The rapid changes in the higher education context driven by political, economic and socio-cultural forces in the latter part of the 20th century have generated concern for quality and created challenges to the implicit and self-evident traditional views about assuring quality in universities (Massy, 2003; Amaral, 2007; Martin and Stella, 2007; Becket and Brookes, 2008). The major changes include: massification of education, greater diversity in terms of programme provision and student types, matching programmes to labour market needs, shrinking resources, heightened accountability and indirect steering of higher education. These have brought

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a call for more formal (explicit and systematized) quality assurance schemes than was needed in the traditional elite universities (Brennan and Shah, 2000). As a result, various countries all over the world have adopted formal quality assurance systems with the purpose to regulate and improve quality of their higher education systems.

Despite the lack of consensus over the concept of quality, formal quality assurance has now become one of the central components of reform and policy instruments to adapt higher education institutions to the increasing expectations from both internal and external stakeholders all over the world. As Reichert (2008) puts it, quality assurance is so widespread and its vocabulary so pervasive nowadays in higher education policy and discourse that one forgets how relatively recent the enthronement of the term 'quality' actually is. The quality revolution in higher education has underscored the expectation that universities must demonstrate that they are providing quality education and strives to improve it (Anderson, 2006).

In the Sub-Saharan African countries, formal quality assurance is an even more recent phenomenon. The increasing concern for quality in many Sub-Saharan African countries comes at a time from growing recognition of the potentially powerful role of higher education for growth and its rapid expansion since the new millennium (Materu, 2007). In the recent past, many of the Sub-Saharan African countries have implemented higher education expansion policies, which resulted in a significant enrolment growth (McPherson, 2008) within the existing and newly emerging colleges and universities as well as in changes regarding student demographics. The demand for access in many Sub-Saharan countries will increase significantly in the coming years due both to demographic growth and to increased access at primary and secondary educational levels (Shabani, 2007). However, despite the rapid enrolment expansion during the last few years, higher education participation rate in this region has remained among the lowest in the world (6%). At present, the major challenges facing many Sub-Saharan African nations include addressing the unmet demand for access through rapid expansion of their higher education improving quality of their education in the context of the prevailing socio-economic, fiscal and political constraints.

A great deal of research work has been conducted in the domain of quality assurance over the past three decades. Despite the progress that has been made through research and debate, there is still no universal consensus on how best to manage quality within higher education (Becket and Brookes, 2008). Much of the research conducted so far focuses on how quality could be defined, on the design and relevance of various national quality assurance schemes, on appraising the applicability of industrial models to higher education, on the tension between improvement and accountability in both external and internal quality assurance approaches,

and on the effects of such quality assurance processes in higher education in the context of developed countries (Harvey and Williams, 2010; Pratasavitskaya and Stensaker, 2010).

Statement of the problem

Since the establishment of the Quality Assurance Unit in 2008, there has not been any empirical research on the implementation challenges of the Unit. Recent studies by Seniwoliba (2014), Okae-Adjei (2012), Tsevi (2014) and Boateng (2014), and Badu-Nyarko (2013) have focused on quality assurance in public universities, polytechnics, private higher education and distance learning respectively. The studies conducted by Seniwoliba (2014) and Okae-Adjei (2012) were generic and focused on student lifecycle framework; Tsevi (2014) examined institutional and programme accreditation; Boateng (2014) assessed barriers to internal quality assurance in private tertiary institutions in Ghana; and Badu-Nyarko (2013) examined quality assurance in undergraduate distance education at the Ghanaian premier university without due consideration for the laid down activities, programmes and the implementation challenges to equip directors of quality assurance department.

In view of the aspects examined by these studies, this study seeks to examine the activities, programmes and the implementation challenges of internal quality assurance of University for Development Studies. The study considered the concepts and challenges of quality assurance practices, the activities and programmes of the Quality Assurance Directorate, the evolution of quality assurance in higher education in Ghana, the University for Development Studies and Quality Assurance as well as the implementation challenges since the establishment of quality assurance in the University. The study therefore seeks to answer questions on the activities and programmes undertaken by UDS and the implementation challenges encountered.

REVIEW OF RELATED LITERATURE

A number of researches have been conducted on quality assurance in higher education in Ghana. As a result of these most of the writers have raised a number of issues on quality assurance following the establishment of quality assurance units in tertiary institutions in Ghana. In this regard, it is appropriate for this study to provide a synopsis of literature on the subject matter of quality assurance.

According to both Okae-Adjei (2012) and Seniwoliba (2014), the student lifecycle framework looks at how students are admitted, taught and assessed through to their graduation with a focus on quality checks at each stage. In the former study, the author concludes that the

Koforidua Polytechnic was yet to establish a quality culture in spite of the efforts in place. The latter study also concludes that despite the efforts of ensuring quality assurance in the University for Development Studies, a lot of students who pass through the system cannot graduate and Seniwoliba attributes this bizarre situation to the quality assurance culture.

Tsevi (2014) and Boateng (2014) looked at the quality assurance in private higher institutions but followed different orientations. Tsevi (2014), considered quality assurance from the viewpoint of both the institutional and programme accreditation. This study was generic and looked at quality assurance in private higher education in Ghana. The study concluded that quality assurance has truly brought quality to accredited institutions and implored the NAB to play its watchdog role in monitoring private institutions. Boateng (2014) looked at barriers to internal quality assurance in private tertiary institutions in Ghana. The thrust of the study was on the perception of staff and students selected private tertiary institutions on national quality assurance and the barriers to the implementation of quality assurance requirements by the government quality assurance agencies. The author concluded that private tertiary institutions should imbue the principles of transparency, openness, responsiveness and ingenuity in the development of a quality culture.

Badu-Nyarko (2013) conducted a similar study focused on quality assurance measures that are in place to safeguard undergraduate distance education at the Ghanaian premier university, University of Ghana. Badu-Nyarko considered quality in the areas of student admissions, orientation, tutorial systems, course develop-ment, management, monitoring and examinations. In the assessment of all these areas, Badu-Nyarko concluded there was maintenance of some form of quality assurance geared towards increasing the confidence and integrity of the distance programmes.

According to Bunoti (2011) challenges in higher education are influenced by several factors including, economic factors, political factors, quality of students and faculty, administrative factors and academic factors etc. According to Al-Atiqi and Deshpande (2009), higher education institutions are facing challenges in several fronts; for example, low rate graduations, apprehension among students, rising questions of relevance of college education for public good. Romina (2013) opined that most institutions of higher learning in Nigeria lack staff development programme for training and re-training of staff. Vibrant staff development programme on a continuous basis will help academics and non-academics to clarify and modify their behaviour, attitude, value, skills and competencies. In this way, they grow and develop in their knowledge and thus become more effective and efficient in the performance of tasks. Staff development is paramount because knowledge of today is only sufficient for today. In this era of knowledge explosion and emergent knowledge based economy, staff development should be the priority of any nation. Quality higher education is dependent on the quality and quantity of human and material resources put in place in institutions of higher learning. The lack of infrastructures such as science laboratories, workshops, students' hostels, libraries and electricity will affect the quality of education. For good quality delivery, these facilities must meet the minimum standard specified by the National Council for Tertiary Education (NCTE) and National Accreditation Board (NAB). For quality teaching and learning, the class size must be small for effective students/teacher interaction. Unfortunately, most institutions of higher learning in Nigeria, the lecture halls are overcrowded with majority of the students standing at the corridors during lectures (Romina, 2013: p 7).

Evolution of quality assurance in higher education in Ghana

Higher education is the facilitator, the bed rock, the power house and the driving force for the strong socio-economic, political, cultural, healthier and industrial development of a nation as higher education institutions are key mechanisms increasingly recognized as wealth and human capital producing industries (Peretomode, 2007).

World Bank (2004) argued that higher education is fundamental to all developing countries if they are to prosper in a world economy where knowledge has become a vital area of advantage. The quality of knowledge which is generated in institutions of higher learning is critical to national competitiveness. It is only quality education that can sharpen the minds of the individual and help transform the society economically, socially and politically. Countries can achieve sustainable development by improving through training in higher level, the skills of their human capitals.

In pursuance of these benefits the government of Ghana formally introduced quality assurance by establishing the National Accreditation Board (NAB), under the Ministry of Education (MoE). It is a national quality assurance agency responsible for quality assurance in higher education within the territorial jurisdiction of Ghana. It was established by Provisional National Defense Council Law 317, 1993 (PNDCLaw 317, 1993) which was later amended by an Act of Parliament, which resulted in the enactment of NAB Act 744, 2007. The PNDCLaw 317 mandates NAB as being the sole institution responsible for the accreditation of both public and private tertiary institutions in Ghana in terms of content and standards of programmes. It is also to determine in consultation with professional bodies or institutions in mounting programmes and the maintenance of professional and academic standards. In addition, NAB

is responsible for determining the equivalents of Degrees, Diplomas and Certificates obtained in Ghana or elsewhere.

The passage of the NAB Act 744, 2007 by the Parliament of Ghana does not only make it to retain the above responsibilities of NAB but also accorded the agency more powers to deal with quality assurance in Ghana. The additional responsibilities which have been assigned to the agency include: publishing the accreditation status of institutions as well as their programmes as deemed appropriate at the commencement of each academic year; and advice the President of Ghana on the grant of a presidential charter to private tertiary institutions. The agency may also perform any other function as assigned to it by the Minister of Education.

Following the PNDCLaw 317 and its subsequent amendment into NAB Act 744, 2007, the NAB made the establishment of Internal Quality Assurance Unit (IQAU) a statutory requirement in tertiary institutions in Ghana. Tertiary institutions that are recognized by NAB are required to establish IQAU within a maximum of five (5) years from the date of first accreditation. According to NAB, the existence of functional IQAU is a key indicator in assessing the performance of an institution towards institutional re-accreditation and the grant of a presidential charter (NAB, 2011).

According to NAB (2011), the functions of IQAU are many and depending on its assigned mandate by the institution, it may perform one of the following functions: review and advise management of the institution's Strong Room; supervise the conduct of examination; facilitate capacity building of academic and support staff within the institution; ensure institutional accreditation process and other quality activities with NAB including annual reporting; facilitate the development, dissemination and application of quality benchmarks for the various academic and administrative activities of the institution; facilitate the collation and integration of feedback from students and other stakeholders on quality related matters in the institution; promote quality culture through the facilitation of workshops and seminars on quality related themes; act as a link agency by coordinating, documenting and disseminating quality matters; develop and maintain a database on quality related information; prepare annual report on quality assurance of the institution based on the quality benchmarks set out for the institution; oversee issues pertaining to the internal and external ranking for the institution and its programmes; managing the institution's affiliation with mentoring institution; and assisting in the development and assessment of curricula.

For the reasons given above, various tertiary institutions particularly public universities/professional institutions and private tertiary institutions have established their quality assurance Units/Directorates/Offices. This is to position the institutions for performance assessment by NAB on one hand and to make them competitive in the global job market by ensuring compliance with internal quality assurance measures and external (national/ international) standards with the potential to promote comparability of qualifications across institutions of higher learning.

The university for development studies and quality assurance

The University for Development Studies (UDS) was established by PNDC Law 279, 1992 with the mandate to blend academic work with community development. In fulfillment of its mandate, the university has proved itself as a centre of excellence in the delivery of higher education in the three Northern Regions of Ghana and beyond. This is manifested in its methodology of teaching as well as its demand driven undergraduate and post-graduate programmes, which have attracted prospective applicants within and outside the country. Within just over two decades of its existence, the University has received commendation in the international arena for holding itself as a credible institution for teaching and learning. This achievement is by no means a chance but a conscious effort by the University through the implementation of quality assurance measures. In order to inculcate a quality assurance culture in the University, a Quality Assurance Unit was established in 2008 to handle issues bordering on quality and enhancement.

Currently, graduates from tertiary institutions are in competition for opportunities in the job market across the world. The production of graduates with the right caliber of skills for the job market is an indication of the quality of training from institutions of higher learning. The implementation of quality assurance at both national and institutional level is in the right direction because graduates from tertiary institutions are in an environment defined by local and national needs on one hand and international expectations and standards on the other. The international expectations and standards have increasingly influenced the current wave of enthusiasm given to quality assurance in all tertiary institutions in the world. It is envisaged that educators, policy makers and faculty members appreciate the role of quality assurance and strive for excellence by setting appropriate standards and draw on the uniqueness of local and national needs as well as international expectations and standards in order to make graduates competitive in the global job market (Hayward, 2006).

The establishment of quality assurance into higher education institutions is aimed at addressing issues in higher education. Conscious of this need, developing countries in the West African Sub-region have established agencies to ensure quality assurance and enhance quality in higher education. This is to ensure that higher

education in developing countries is comparable to those in developed countries (Jonathan, 2000).

RESEARCH METHODOLOGY

The study was carried out in the University for Development Studies (UDS), Tamale. The University has four satellite Campuses spread across the three regions of the North. The Campuses are Navrongo (Upper East Region), Wa (Upper West Region), Nyankpala and Tamale (Northern Region). The administrative seat of the University is in Tamale, which hosts the Central Administration. The main administrative functions of the University are carried out in the Central Administration implying that all the official correspondence of the university takes place in Tamale. There are also offices of Deans of Faculties/Schools as well as other administrative offices in the Campuses.

Research design

The study, geared towards understanding the implementation challenges of quality assurance of a multi-campus public university, used a descriptive research design. Bhattacherjee (2012) stresses that descriptive research has the primary aim of doing careful observation and comprehensive documentation of a phenomenon of interest. He noted that such observation is usually guided by the scientific method. The study used a qualitative research approach. Thus, the study relied on the multiple meanings that respondents ascribe to a phenomenon of study based on their experiences (Creswell, 2003). In using this approach, the researcher collected open-ended data in order to probe for further explanation.

Population and sampling

The university has an academic staff population of 618 (554 males and 64 females). The student population is made up 16,878 males and 6,577 females, making a grand total of 23, 455. Considering the huge numbers and the fact that most of the lecturers have little or no knowledge of the rational for the establishment of the Directorate of the Academic Quality Assurance, the purposive sampling approach was used to select the 12 Deans of Faculties and Schools, 12 Faculty Examination officers, 5 staff of the directorate, 10 lecturers 10 students. The purposive sampling technique is based on the researchers' use of their special knowledge and expertise in the selection of participants for inclusion in the research. This is to ensure that individuals with certain attributes are included in the study. Purposive samples are often used when the goal of the research is to describe a situation rather than generalization (Glassner et al., 1983).

Data collection procedure

There were two main sources of data for this study: secondary and primary sources. The secondary sources of data were obtained from documented literature including Acts of Parliament that established National Accreditation Board (NAB), National Council for Tertiary Education (NCTE) and guidelines and reports of these agencies. The researchers also consulted books, journals newspaper articles and reports relevant to the study. The primary source of data was obtained from the field using an interview schedule and participants observation. The same interview guide was used for the different categories of respondents in order to ensure triangulation of the various responses. According to Denzin

(1970) triangulation is broadly viewed as the "combination of methodology in the study of the same phenomenon". Denzin drew a distinction between *within-method* and *between-method* triangulation. The former which involves the use of varieties of the same method to investigate a research issue was adopted for the study.

Data analysis

The study used a qualitative data analysis using 2007 Excel spread sheet packages. It simply involves the analysis of non-numeric (qualitative) data from interviews and transcripts. Qualitative analysis of data to a large extent depends on the analytic and integrative skills of the researcher as well as the personal knowledge of the geographic and social context in which the data was collected.

The emphasis in qualitative data analysis is on "sense making" or alternatively understanding the phenomena of interest in the social setting of the study (Bhattacherjee, 2012). Therefore, thematic analysis was employed. To proceed with the analysis, there was data cleaning as the first step. At this stage, the data collected was edited to deal with all errors and uncompleted statements in the course of filling the interview schedule with emphasis on maintaining the original ideas provided by respondents. The researchers then went through the descriptive statements of the respondents in order to identify patterns of responses. This formed the basis for coding and categorization of responses. The analysis was then carried out based on the themes that emerged from the data.

FINDINGS AND DISCUSSION

Respondents identified the primary functions of the Directorate as ensuring that examination results from the Faculties and Schools of the University are authentic and cleaned devoid of any typographical errors. This is in line with the Directorate's mandate of setting up a vetting committee which vets all examination results on behalf of the academic board. Based on the observations made, the committee may make comments and provide suggestions for any corrections to be effected before they are submitted to the Academic Quality Assurance Directorate. The Directorate in collaboration with Deans and their respective Faculty Examination Officers present the vetted results at the Academic Board Meeting for approval. Once the results are approved, it can be used for processing students' transcripts and attestation letters. In view of this processes, Lewis, et al. (2008) posits that learning organizations are organization skilled at creating, acquiring, and transforming knowledge; modifying its behaviour; facilitating the learning of all its members, and continuously transforms itself.

It was evident from the responses that the Directorate organizes orientation workshops for newly appointed Senior Members (Academic and Non-Academic) in the University where participants are taken through topics such as Preparing to Teach, Teaching Methodology at the Tertiary Level, the new University Lecturer or Administrator, Assessment of Students Learning and Testing, ICT as a tool for Effective Teaching and

Learning, Demystifying the Quagmire of Conducting an Impactful Research and Scholarly Publishing in Tertiary Institutions as well as Mentoring in the Academia. In this perspective, universities are conceptualized as being both explicitly and implicitly built on notions of relevance to the importance of learning at an individual level. This perspective considers quality of education as a dynamic concept involving continuous improvement and development of members, practices, processes, and outcomes of an educational organization (Cheng and Tam, 1997: p23). The main characteristics of a learning organization such as universities are: learning culture, free exchange and flow of information, commitment to learning, valuing people, climate of openness and trust and learning from experience (Nakpodia, 2009: p80).

Respondents also state that the Directorate periodically conducts routine assessment of courses and or lecturers by students. In this exercise, they mentioned that students are given the opportunity to assess the output of their course lecturers as well as the courses themselves using pre-designed questionnaire. The broad areas identified were; the assessment of exercise provided to students including course presentation, lecturer's demeanor in class, mode of delivery, pedagogy and learning environment. With the exception of the learning environment, the rest of the areas of assessment relate to the lecturer's performance. Respondents revealed that students are also given opportunity to comment either on the lecturer or the course being assessed. The aim of the exercise is to improve quality teaching and learning in the campuses of the University. This idea is not different from the fact that Lim (2001) argues that personal mastery is conjoined to the development of the individual's vision whereas systems thinking involve integrating others into a coherent theory. He therefore concludes that the main purpose of assessing lecturers and courses is to ensure that there are visible signs of implementing successful quality assurance practices in the university which will intend improve students' learning and in the long run provide good job opportunities for grandaunts.

According to the respondents the Directorate of Academic Quality Assurance (DAQA) also conducts periodic monitoring and supervises all trimester examination of lectures as part of the process of assessing both students' and lecturers' response to lectures and collect information from the examination halls using questionnaire respectively. In line with this activity, Barnett (1992), for instance argued that, at whatever level (national, institutional or programme), serious interest in the quality of higher education should entail the improvement of the student experience. Astin (1993) had also the opinion that institutional excellence should be measured in terms of the growth and improvement in students learning. In a similar vein, Tam (2002) noted that 'true quality' depends to a large extent on the institution's commitment to, and interest in the educational and

personal development of its students.

According to Dearstyne (1985), records are essential to the administration of High Academic Institutions. Records contain the information that keeps institutional programmes functioning and they give management of higher education a basis for making decisions, administering programmes and providing administrative continuity with past operations. It is in the light of this argument that respondents revealed that the Directorate keeps appropriate and up to date information on the accreditation status of the university programmes; records of affiliated institutions and those in the process of seeking affiliation; copies of examination results; documents of the National Accreditation Board; and records of the National Council for Tertiary Education are also kept to serve as reference materials for managing quality related issues in the University.

Respondents openly asserted that the Directorate considers students as its primary focus. In line with this assertion, it is believed that any university responsive to quality assurance highlights models where students are in the centre of its services. The models should focus on quality of programmes that contribute to the improvement of students learning and development. By this design all the Universities would be working towards enhancing quality of learning and thereby prepare the learner as well as society to face future problems and opportunities. The respondents argued that the quality management framework for higher education should emphasize the conditions that affect quality of student learning. These include a focus on learning outcomes, on curricula, on educational processes, and on quality management. This means that invariably the university will be focusing on the importance of learning and on culture of continuous quality improvement. They said it was in this light that the Directorate vets documents from Faculties and Schools on the curriculum of programme proposals for National Council for Tertiary Education (NCTE) for approval and National Accreditation Board (NAB) for accreditation to meet the tertiary institutions standard in Ghana. In furtherance of this importance, Barnett (1992) argues, that the student's experience is of high quality where there is a process of student development designed to enable students advance to the higher order capabilities, which typify a genuine higher education.

One critical area respondents think the Directorate was greatly closing the gap between lecturers and students was it responsibility of investigating appeals brought to its notice by students and staff on matters bordering on alleged involvement in examination malpractices and assault. Any student who feels aggrieved by sanctions imposed on him/her for any examination malpractice or assault by a lecturer has the mandate to appeal to the Directorate for review and or investigation and subsequent recommendation of the findings to the Vice Chancellor for action. This supports the earlier assertion

that any good quality assurance model should focus attention on the students being in the centre of its services.

Challenges of the directorate of academic quality assurance

Tertiary institutions in developing countries including those in the Sub-Saharan Africa region are usually confronted with a number of challenges. One of such challenges identified by respondents was inadequate staffing and the non-availability of offices across the campuses of the University. Despite the fact that the Directorate has many functions to perform, it solely relies on the services of Faculty Officers who most of the time do not carry out the assignments entrusted to them by the Directorate. Badu-Nyarko (2013) in a similar study brought to the fore similar issues on the coordination of undergraduate distance education programmes and attributed the situation to weak linkage between academic departments that run the programmes on one hand and Unit Coordinators and Staff on the other. In cognizance of this assertion, it is only the Director of DAQA in the University who attends quality assurance workshops organized by external quality assurance agencies, while other members of staff in the Directorate are left aloof. Apart from that, there exist no internally planned training programmes to equip the other staff with the necessary skills to make them function adequately. Okae-Adjei (2012) observed that there was inadequate staff at the Quality Assurance Unit of Koforidua Polytechnic which affected the performance of the Unit. He concluded that a few staff in the Unit have very little experience in quality assurance matters. In support of this assertion, Romina (2013) posited that most institutions of higher learning in Nigeria lack staff development programme for training and re-training of staff. Vibrant staff development programme on a continuous basis will help academics and non-academics to clarify and modify their behaviour, attitude, value, skills and competencies. In this way, they grow and develop in their knowledge and thus become more effective and efficient in the performance of tasks.

Respondents discovered the absence of quality culture in the university as a major challenge that has made some members of staff to misconstrue the concept of quality assurance as such, it is viewed as a fault finding unit and mischievous with the intention of implicating staff and so some staff view activities of the Directorate of Academic Quality Assurance with suspicion. Instead of quality assurance being seen as a transformative endeavour of the university which demands collective responsibility, the legitimacy of the Directorate is being challenged in addressing quality assurance concerns in the University. For instance, some academic staff are uncomfortable with the monitoring of lectures at the

beginning of each teaching Trimester. Even though, the main rationale for the exercise is to assess lecturers and students' response to lectures performance, it is misconstrued as spying on their service. As a result of this perception, information on quality related matters is often view with some ambivalence from staff. This is evident in the way lecturers perceive the activities of the Directorate of Academic Quality Assurance and one can confidently conclude that considering the present situation, quality assurance is nascent and this may take time for quality culture to be built in the University. Okae-Adjei (2012) and Boateng (2014) also alluded that inconsistent quality culture was a challenge in ensuring quality assurance in tertiary institutions. In the view of the former, he indicated that quality assurance has not been fully embraced by all members of staff and view the Quality Assurance Unit of Koforidua Polytechnic with suspicion. The latter opined that there was dominance culture in private tertiary institutions which hampered instilling a quality culture. He asserted that with a dominant culture coupled with inevitability of change leads to resistance.

The need for physical and financial resources for the effective and efficient actualization of quality assurance activities was another challenge that came out clearly. In spite of the importance of these resources, the researchers observed that office space was limited and crowded with pile up of used papers especially in the general office. The request of the Directorate for laptops, desk top computers and their accessories, projectors, and stationery was delayed beyond the expected time before they were supplied. Besides, that, the amount of financial resources allocated to the Directorate falls short of its annual budget. This budgetary constraint poses a huge challenge to the discharge of the functions of the Directorate. Similarly, Okae-Adjei (2012) in his study noted that the Quality Assurance Unit of the Koforidua Polytechnic was inadequately resourced to enable it carry out its mandate.

Quality assurance thrives in an environment where leadership and management of higher education institutions are committed to ensuring that quality becomes realistic. The study revealed that some Heads of Department (HoDs) and Sectional Heads have not fully committed themselves to assisting the Directorate to carry out quality checks in departments, sections and units within their jurisdiction. Some members of staff perceive the role of the Directorate as interference of their mandatory activities while others term it as "policing". Seniwoliba (2014) pointed out that leadership and management in matters of quality assurance in the University for Development Studies was apathetic and inefficient. Okae-Adjei (2012) in a similar opinion cited inexperienced leadership at the departmental level to deal with issues and problems that border on quality assurance. To buttress this challenge, Romina (2013)

argued that quality higher education is dependent on the quality and quantity of human and material resources put in place in institutions of higher learning. The lack of infrastructures such as science laboratories, workshops, students' hostels, libraries and electricity will affect the quality of education. For good quality delivery, these facilities must meet the minimum standard specified by the National Council for Tertiary Education (NCTE) and National Accreditation Board (NAB). For quality teaching and learning, the class size must be small for effective students/teacher interaction. Unfortunately, most institutions of higher learning in Nigeria, the lecture halls are overcrowded with majority of the students standing at the corridors during lectures.

The absence of a workable strategic plan was also cited as a factor adversely affecting the institutionalization of quality assurance. However, this purpose of a strategic plan in higher education institutions cannot be glossed over. It sets out the strengths, weaknesses, goals, resource requirements and future prospects of a higher education institution. The strategic plan culminates into the building of stronger and effective higher education institutions for the enhancement of performance and quality. In spite of the importance of a strategic plan, the university has no current strategic plan in place. The first strategic plan for the university spanned from 2003-2008 but has now been outdated and need review to reflect new insights and strategic direction for the university to diversify and make progress. In a similar concern, the Directorate has no strategic plan in place which outlines how quality assurance should be enhanced in the University. In a study conducted by Boateng (2014) it had been revealed that there was weak emphasis on strategic planning in private tertiary institutions.

Conclusion

The establishment of quality assurance in higher education in Ghana has been phenomenal following the setting up of formal government agencies in the early 1990s. Since the establishment of National Council for Tertiary Education (NCTE) and National Accreditation Board (NAB), quality assurance has firmly taken root in both public and private tertiary institutions in Ghana. As more private tertiary institutions are venturing into the tertiary education sector, it is appropriate that management of public universities such as UDS support the Directorate of the Academic Quality Assurance to succeed in bringing the needed academic quality and enhancement in the University.

RECOMMENDATIONS

In view of the implementation challenges enumerated above, the following have been recommended for the attention of Management of the University for Development Studies.

1. Management should ensure that the Directorate of Academic Quality Assurance has well equipped offices in all campuses of the University with staff at post. This will go a long way to improve coordination of quality assurance activities across the Campuses.
2. The Directorate of Academic Quality Assurance with the support of Management of the University should create an enabling environment for information dis-semination on quality assurance through workshops and seminars for all staff. This will enhance the idea of building a quality culture in the University.
3. The university leadership should at all levels and the Council be involved in and committed to the development and implementation of quality assurance. This shall involve setting the overall direction of the institution towards improvement of quality education, introducing policies and structures for quality assurance with clear responsibility at all levels and monitoring their implementation. In this regard, an institution's leadership and management system is effective if it ensures the active participation of all actors (staff, students, etc.). A professionally capable, credible and visionary leader and/or manager is also crucial in this regard.
4. Management should adequately resource the Directorate of Academic Quality Assurance to carry out it assigned mandate.
5. Management of the University should ensure that a new strategic plan of the university is prepared upon which the Directorate of Academic Quality Assurance can craft its own. The availability of a strategic plan of the Directorate will provide a sense of direction for the growth and enhancement of quality assurance in the university.

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

Investigating lifelong learning dispositions of students studying English language and literature in terms of different variables

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This study aims to determine lifelong learning dispositions of English Language and Literature students in terms of gender, grade levels, and age variables. Descriptive research design was used. The study group consisted of 402 students studying English Language and Literature at Cumhuriyet University in Sivas, Turkey. Research data were collected with "Lifelong Learning Tendency Scale" developed by Coşkun (2009). Data were analyzed using frequencies, percentages, arithmetic mean, standard deviation, independent sample t-test, One-Way ANOVA and Tukey test. The results revealed that students studying English Language and Literature had high level of lifelong learning dispositions. While no significant differences were observed in terms of gender variable, there were significant differences in terms of grade levels in favor of 4th grade and age variable in favor of the age range between 20-22.

Key words: Lifelong learning, disposition, students studying English Language and Literature.

INTRODUCTION

Contemporary society has turned into a knowledge-based society to succeed in the changing educational, economic and political dynamics of the modern world; and therefore, in order to meet people's demand for upgrading their knowledge and skills to adapt to the rapidly changing environment, lifelong learning has emerged as a necessary guiding and a road map for the worldwide knowledge society of the future.

Lifelong learning is "the process of learning which occurs throughout life" (Jarvis, 1990, p. 203) and entails learning from the cradle to the grave (Cohen, 1975). There are several definitions that have included learning as an ongoing process beginning at birth and ending only with death. Lifelong learning is operationally defined as education provided to people of all ages (Cheng et al., 1999) and is regarded as an integral part of the texture of living (Dowd, 1979). Therefore, lifelong learning includes all kinds of learning experiences in life (Candy et al., 1994).

Lifelong learning is neither a privilege nor a right (Cross, 1981); it involves the whole society and encompasses all learning forms, formal, non-formal, and informal at all ages and stages of life, irrespective of where it occurs and who organizes it (Candy, 2000; Cropley, 1979; Dave, 1975; Dinevski and Dinevski, 2004; Faure, et al., 1972; Lengrand, 1970; Preece, 2011; Tuschling and

Engemann, 2006; Wain, 2009). Formal education means "full-time school programs," non-formal education refers to "classroom-based courses," and informal education involves "all other deliberate forms of self-directed or collected learning (Livingstone, 1999). While lifelong learning has "re-emerged in the past few years as one of the 'hottest' topics in public discussion" concerning the organization of educational thought (Hake, 1999, p.79), the idea of lifelong learning is not new. Field (2006) traced the genesis of the concept of lifelong learning back to the "intellectual ferment that followed the end of World War One" (p. 12). On the other hand, the concept of lifelong learning was emphasized by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) for the first time, in 1972 in the international field (Faure, et al., 1972) and since then lifelong learning and lifelong education have become two of the underlying principles of the UNESCO (Faure, 1972). The study of lifelong learning as a discipline began in the early 20th century (Asundi and Karisiddappa, 2006) and became a topic of discussion only in the first quarter of the 20th century (Knowles, 1975). In addition, the discourses on lifelong learning are divided into three time periods: (a) a fervent introduction of the principles of lifelong learning that emerged in the 1920s and persisted through the 1970s, (b) a quiet interlude in the 1980s where very little lifelong learning research was conducted, and (c) a resurgence of interest in lifelong learning in the 1990's that has continued into the present reflecting paradigmatic shifts in emphasis from education to learning and from non-vocational to vocational learning (Belanger, 1997; Boshier, 1998 and 2005; Field, 2006; Wilson, 2009). Some events supporting lifelong learning as a major global educational challenge of the future are as follows: (a) 1996 was the "European Year of Lifelong Learning"; (b) UNESCO included "Lifetime -Education" as one of the key issues in its planning; and (c) the G7-G8 group of countries named "Lifelong Learning" as a main strategy in the fight against unemployment (Fischer, 2001). In late 1997, the Commission for a Nation of Lifelong Learners defined lifelong learning as "a continuously supportive process which stimulates and empowers individuals...to acquire all the knowledge, values, skills and under-standing they will require throughout their lifetimes...and to apply them with confidence, creativity, and enjoyment in all roles, circumstances, and environments." The philosophy underlying this definition of lifelong learning is as follows:

1. Continuous—Lifelong learning never stops.
2. Supportive—It is not done alone.
3. Stimulating and empowering—It is self-directed and active, not passive.
4. Lifetime—It happens from our first breath to our last.
5. Applied—Lifelong learning is not just for knowledge's sake.

6. Confidence, creativity, and enjoyment—It is a positive, fulfilling experience (Duyff, 1999).

Since the sole source of knowledge in traditional educational systems is the teacher, lifelong competencies cannot be acquired by learners through teacher dictation (Soni, 2012). Some characteristics of traditional learning and lifelong learning are presented in Table 1.

As is seen in Table 1, lifelong learning enables learners to acquire and construct all forms of learning in a knowledgebased society through not only formal education but also ongoing work activities. Moreover, as well as being an ongoing process over the individual's lifespan, "lifelong learning makes each individual benefit from universal learning opportunities regardless of their age, gender and status" (Sweeting, 2000, p. 261). Some functions of lifelong learning argued by Bagnall (1990) are as follows:

(a) The preparation of individuals for the management of their lives;
(b) The distribution of education throughout a person's lifespan;
(c) The educative function of the whole of one's life experience;
(d) The identification of education with the lifespan.

The concept of lifelong learning is frequently used synonymously with lifelong education. However, the two are not one and the same, but rather one is subsumed under the other (Overly, 1979; Stock, 1979; Knapper and Cropley, 1985; Chapman & Aspin, 1997; Leicester & Parker, 2001).

Lifelong education

Lifelong learning is the result of lifelong education which is a continuous formal and informal process that occurs over a life span producing a 'learning society' (Wain, 1987). Lifelong education has been referred to as "adult education" (Hiemstra, 1976, p. 16; Stock, 1979, p. 78; Knapper and Cropley, 1985, p. 62; Leicester and Parker, 2001, p. 117) "learning to learn" (Mentkowski and Doherty, 1984, p.5), "recurrent education" (Stock,1979, p. 78; Knapper and Cropley, 1985, p.62), "learning over the lifespan" (Titmus, 1999, p.343), "self-directed learning" (Banta, 1993, p.16), "learning without boundaries" (Edwards and Usher, 2001, p. 276), and "permanent learning" (Overly, 1979).

Lifelong education is a process of accomplishing personal, social and professional development throughout the life span of individuals (Dave, 1975). In other words, it refers to learning activities, including all skills and branches of knowledge, using all possible means, and giving the opportunity to all people for full development of

Table 1. Characteristics of traditional and lifelong learning models.

	Traditional Learning	Lifelong Learning
Emphasis	Basic skills	Education embedded in ongoing work activities
Mode	Knowledge absorption	Knowledge construction
New topics	Defined by curricula	Arise incidentally from work situations
Trainers	Expound subject matter (Teaching)	Engage in work practice (Facilitating)
Problems	Given	Constructed
Method to solution	Mostly personal work	Group work
Role	Expert-Novice model	Reciprocal learning
Assessment	Basis for promotion	Guide learning strategies
Structure	Pedagogy (logical structure)	Work activity

Soni, (2012.

their personalities (Sell, 1978).   It enables people to learn at different times, in different ways, for different purposes at various stages of their lives and careers (Preece, 2011). Continuing education is only one part of the educational process and exists as one stage within the lifelong education continuum (Madill, 1984). However, "lifelong education considers the formal and non-formal learning processes in which children, young people, and adults are involved during their lifetimes" (p. 183). Medel-Añonuevo, et al. (2001) stated that according to the UNESCO Institute for Education, the idea of lifelong education is the keystone of the learning society and therefore, every individual must be in a position to keep learning throughout his life. Considering that lifelong education is seen as a process that continues throughout the entire life span, it responds to different requirements throughout the working and life cycle (Barker, 1998); it is a way to systematically coordinate and facilitate learning (Knapper and Cropley, 1985). Similarly, Cropley (1980) noted that "if lifelong education were to become a means for facilitating, lifelong learning should last the whole life of the individual; acknowledge the contribution of all available educational influences including formal, non-formal and informal" (p. 3). According to Cropley (1979), lifelong education is a set of organizational, financial, and didactic principles established with the aim of fostering lifelong learning. Therefore, "lifelong education is the system and lifelong learning is the content, the goal and the result" (Knapper & Cropley, 2000, p. 6) and thus, lifelong education is planned, systematic, and purposeful. According to Knapper and Cropley (2000, 12):

(a) Lifelong education is intentional. Learners are aware that they are learning.
(b) It has specific goals which are the reason why learning is learned.
(c) The learners intend to retain and use what has been learned for a considerable period of time.

According to Toffler (1980) progression seen in a society has gradual waves. He identified the first wave as "agriculturally-based society"; the second wave as "industrially based society" and the third wave as "information-based society". To him, lifelong education is seen as "lifejacket for the third wave" (p. 282) offering each individual the possibility of maintaining balance while the environment shifts and changes. In addition, Savicevic, (1999) suggested that continuity and integration are two basic postulates that lifelong education includes. He further stated that "lifelong education is an essential factor in the creation of human happiness and it influences changes of the environment (family, working, cultural), as well as the personality" (p. 179).

Traits and skills of lifelong learners

A lifelong learner is a person who possesses the motivation and attitude necessary to continually pursue learning through all stages of his or her life (Candy, 1991; Cropley and Dave 1978; Knapper and Cropley, 2000; Wain, 1987). Some traits that an ideal lifelong learner possesses are his/her being: (a)strongly aware of the relationship between learning and real life; (b) being aware of the need for lifelong learning; (c) being highly motivated to undertake lifelong learning; and (d) having a self concept that is conducive to lifelong learning (Knapper and Cropley, 2000, p. 47).
 In addition, prominent traits of a lifelong learner have been outlined as curious, venturesome and creative, innovative in practice, resourceful, motivated to learn, willingness to make and learn from mistakes, flexible in thinking, methodical and disciplined, logical and analytical, reflective and self-aware (Brookfield, 1992; Candy, 1991; Collins, 2009). The necessary skills of a lifelong learner include, the capacity to set personal objectives in a realistic way; effectiveness in applying knowledge already possessed; efficiency in evaluating one's own learning; effectiveness in using different learning strategies; and the ability to use and interpret materials from different subject

areas (Knapper and Cropley, 2000). According to Collins (2009) these skills include well-developed communication skills, self-directed learning skills, information-seeking and retrieval skills, high-order thinking skills and meta-cognitive skills.

Teachers as lifelong learners

Although "education is fundamentally an activity of continuous renewal and exploration" (Rud and Oldendorf, 1992, p. 45), most education systems are not designed to promote lifelong learning. Jensen (1987) stated that the system which only rewards teachers for endurance, not excellence, does not encourage reform. However, for lifelong learner teachers who employ the best practices, endurance is not a factor in resistance to change. Excellence in teaching, as in other professions, requires continuing education and the ongoing refinement of practice (Shapiro, 1995, p. 2).

Even if no one has been able to identify an ideal teacher personality (Van Manen, 1991), teachers are often viewed simply as transmitters of inert and approved knowledge (Darling-Hammond, 1990). Moreover teachers as continuous learners must be role models for their students and "in order to develop a love of learning in students, teachers must first be learners themselves" (Jalongo, 1986, p. 355) and also in order to continually update their base of knowledge, to use new strategies, and to adapt to changing student and community needs, it is a must for teachers to be lifelong learners (Jensen, 1987). Similarly, Dimova (2012, p. 282) stated that "as models of lifelong learners, teachers should constantly display awareness of the incompleteness of their existing knowledge and intellectual curiosity to find ways for reducing the gaps". Thus, "teacher development as knowledge and skill development"', is key to successful lifelong learning, both of the teachers and their students (Hargreaves and Fullan, 1992, p. 36).

According to Johnson (1990) good teaching is a creative process. Teachers who lack opportunities for learning and growth become intellectually depleted. As long as teachers become learners, they can stimulate students to be continuous learners (Fullan, 1993). Therefore, some attributes of teachers as learners indicated by Steuteville-Brodinsky,et al. (1989) are: being flexible and willing to learn; being committed to teaching and loyal to the profession; having esteem for themselves as professionals; keeping up with educational research and literature; and looking forward to professional development__ eager to grow professionally.

Language Learning within Lifelong Learning

Because English is a common lingua franca and a bridge

across the globe, there is a growing need to boost interest and to find new and efficient ways for developing English proficiency. Therefore, educators have made efforts, looking for ways to optimize effective language teaching. National Standards for Foreign Language Learning (ACTFL, 1999) discussed five core standards in foreign language education, also known as the five C's which include communication, culture, connections, comparisons, and communities. Lifelong learning takes place under the title of communities (Standard 5-2) and "implies that through the regular access to authentic texts and the discovery of new interpretations, students become lifelong learners (Breiner-Sanders et al., 2000). Furthermore, "the ultimate goal of foreign language education is to create a lifelong desire to learn and grow intellectually" (Dimova, 2012, p.21). According to Kubota (2011, p.475), "learning a foreign language, in particular English, can be a lifelong hobby driven by intellectual curiosity or a pursuit of casual or serious leisure". The European Union (EU) put in place a set of actions designed to promote language education and learning under the framework of community programs to be implemented between 2004 and 2006 (COM, 2008). The specific objectives identified in the action plan and related to lifelong learning are: learning a mother tongue plus two other languages from a very early age; continuing language learning in secondary education and vocational training; continuing language learning in higher education; encouraging language learning among adults and developing language learning for persons with special needs (COM, 2003). In addition, in the objectives of the European Year of Languages, lifelong language learning take place for the development of intercultural understanding through multilingualism and language instruction (COM, 1999).

Relevant literature has revealed that there is an increase in lifelong learning based studies that have been carried out in Turkey in the 2000s. Most researches conducted by Kara and Kürüm (2007), Demirel and Akkoyunlu (2010), Demirel and Yağcı (2012), Gencel (2013), İzci and Koç (2012), Kılıç (2014), Oral and Yazar (2015) and Şahin et al. (2010) were focused on prospective teachers. In addition, Coşkun and Demirel (2012) and Karakuş (2013) disclosed university students' lifelong learning dispositions and competences in their studies. Furthermore, lifelong learning from teachers' perspectives has been investigated in some studies conducted by Ayra and Kösterelioğlu (2015), Özcan (2011), Selvi (2011), Soran et al. (2006), Şahin and Aragök (2014) and Yavuz et al. (2014a). The reason for involving English language and Literature students in this research is to find out whether knowing English at least at an advanced level affects their lifelong learning efforts.

This study aims to determine the lifelong learning dispositions of English Language and Literature students in terms of gender, grade levels, and age variables, and

Table 2. The level of lifelong learning dispositions of the students.

Lifelong Learning Tendency Scale	n	Minimum	Maximum	$\overline{X}$	sd
Overall Scale	402	63	145	95.14	14.99
1st Sub- dimension: Motivation		10	36	30.28	4.75
2nd Sub- dimension: Perseverance		7	36	25.57	6.24
3rd Sub- dimension: Lack of self-regulation		6	33	15.29	6.63
4th Sub- dimension: Lack of curiosity		9	54	23.99	9.65

therefore, it would be fruitful for future researches to examine the impact of knowing a foreign language on lifelong learning dispositions. To fulfill the purpose of this study, the following research questions were addressed:

RQ1: What level of lifelong learning dispositions do English Language and Literature students have?
RQ2: How do English Language and Literature students' lifelong learning dispositions differ in terms of gender, grade level, and age variables?

METHOD

Research model

A descriptive research design was employed in this study. Descriptive research is used to describe a current situation that existed in the past or exists now in the way it is (Karasar, 2009).

Study group

The study group for the research consisted of 402 students, 147 being males (36.6%) and 255 females (63.4%), studying in the Faculty of English Language and Literature at the Cumhuriyet University in Turkey during the spring semester of the 2014 - 2015 academic year. The study group was selected randomly through convenience sampling method among 604 English language and literature students, of whom 124 were in preparatory grade; 123 in 1st grade; 123 were in 2nd grade; 118 were in 3rd grade; 116 were in 4th grade. Convenience sampling method enables researchers to gain practicality without incurring the cost or time required to select a random sample (Yıldırım & Şimşek, 2006). Of the students in study group 29.6% (n=119) were from preparatory grade, 21.6% (n= 87) from 1st grade (freshman), 18.9% (n= 76) from 2nd grade (sophomore), 20.6% (n=83) from 3rd grade (junior), and 9.2 % (n=37) from 4th grade (senior).

Instrument

The research data were obtained through Lifelong Learning Tendency Scale (LLTS) developed by Coskun (2009). This six-point scale, ranging from 1-6, consists of 27 items and four sub-dimensions namely motivation, perseverance, lack of self-regulation and lack of curiosity. The Cronbach's alpha internal consistency coefficient of the scale was computed as (Coşkun and Demirel, 2012). Pearson correlations coefficient was at the level of .67. Kaiser-Meyer-Olkin (KMO) value was found to be .89. The total

maximum score of the scale is (27 x 6)162, the minimum score is (27 x 1) 27 and the medium score is (27 x 3.5) 94.5 (Coşkun and Demirel, 2012). While the maximum score of the 1st, 2nd and 3rd sub- dimensions (motivation, perseverance and lack of self-regulation) of the scale is (6x 6) 36, the minimum score is (6 x 1) 6 and the medium score is (6 x 3.5) 21, the maximum score of the 4th sub- dimension (lack of self-curiosity) is (9 x 6) 54, the minimum score is (9 x 1) 9 and the medium score is (9 x 3.5) 31.5.

Data analysis

The SPSS 18.0 package program was used for analyzing the data focusing on frequencies, percentages, arithmetic mean, standard deviation, independent sample t-test, one-way ANOVA and Tukey test. All P values below 0.05 were taken to indicate statistical significance.

FINDINGS

The first research question asked what level of lifelong learning dispositions that the participants had. The mean scores of the participants obtained from the scale and the standard deviation of the distribution are presented in Table 2.

According to the scores that the participants obtained from the overall scale, as is indicated in Table 2, the least score was (63), the highest score was (145), and the mean score was ($\overline{X}$=95.14). This result shows that the participants have a high level of lifelong learning dispositions with respect to being in the upper value of the medium score of the scale (94,5). According to Coşkun and Demirel (2012), while the first two dimensions of the Lifelong Learning Tendency Scale (LLTS) aim to determine affective organization related to lifelong learning desire and effort, the last two dimensions tend to make regulations related to lifelong learning reasons and conditions. According to the findings obtained from the sub-dimensions of the scale, while the mean scores of the sub- dimensions---namely motivation ($\overline{X}$=30.28) and perseverance ($\overline{X}$=25.57) were higher than the medium score (21), the mean scores of lack of self-regulation ($\overline{X}$=15.29 and lack of curiosity ($\overline{X}$=23.99) were at lower levels than the medium scores calculated related to these sub-dimensions. High scores from the

Table 3. Independent groups t-test scores of the students in terms of gender variable.

Lifelong Learning Tendency Scale	N 402	Female (n= 255; 63.4 %)		Male (n= 147; 36.6 %)		T &P Values		Levene's Test	
		$\overline{X}$	Sd	$\overline{X}$	Sd	t	P	F	P
Overall Scale		94.57	15.55	96.12	13.98	1.000	.318	.059	.282
Motivation		30.25	4.88	30.31	4.51	.140	.889	.152	.697
Perseverance		25.34	6.35	25.97	6.06	.983	.326	1.177	.279
Lack of self-regulation		15.09	6.73	15.65	6.45	.810	.418	.843	.359
Lack of curiosity		23.89	9.70	24.18	9.59	.293	.769	.005	.942

P>.05.

Table 4. The Descriptive statistical results (the mean scores and standard deviations) demonstrating students' lifelong learning dispositions in terms of grade level.

N=402	Overall Scale		Motivation		Perseverance		Lack of selfregulation		Lack of curiosity	
	$\overline{X}$	Sd	$\overline{X}$	Sd	$\overline{X}$	Sd	$\overline{X}$	Sd	$\overline{X}$	Sd
Prep. grade (n= 119; 29.6 %)	95.91	14.41	31.55	3.53	27.44	5.25	14.08	6.66	22.84	9.89
1st grade (n= 87; 21.6 %)	96.48	14.55	31.24	3.89	27.10	6.99	14.82	6.32	23.32	10.26
2nd grade (n= 76; 18.9 %)	89.93	13.79	28.16	5.92	23.43	7.01	14.95	5.74	23.39	8.24
3rd grade (n= 83; 20.6 %)	96.05	16.47	29.71	5.04	25.02	5.10	17.19	6.91	25.66	9.55
4th grade (n= 37; 9.2 %)	98.14	15.19	29.54	4.96	25.57	6.24	16.76	7.40	26.81	9.76

first two sub dimensions and low scores from the last two sub dimensions are expected to show from this scale as an indicator of high level of lifelong learning dispositions (Ayra and Kösterelioğlu, 2015).

To find out the answer to the second research question on how English Language and Literature students' lifelong learning dispositions differed in terms of gender, grade level, and age variables, the following analyses were done:

Findings on the gender variable

Mean, standard deviation and independent t test scores of the students in terms of the gender variable are indicated in Table 3.

Table 3 shows that although male students have higher mean scores obtained from the overall scale and all sub-dimensions than female students, there are no statistically significant gender differences [p>.05] in terms of mean scores of students.

Findings on the grade level variable

The mean scores of lifelong learning dispositions of the students and standard deviations in terms of their grade levels are presented in Table 4

Table 4 indicates that when the overall scale is considered, lifelong learning dispositions of the students in all grades range between ($\overline{X}$ =89.93) and ($\overline{X}$ =98.14). While students in the 4th grade have the highest lifelong learning dispositions, students in 2nd grade have the lowest ones. The respective higher scores obtained from the sub- dimensions were as follows: for motivation: prep grade had ($\overline{X}$ =31.55), for perseverance: prep grade had ($\overline{X}$ =17.19), and for lack of curiosity: 4th grade had (=26.81).

Table 5. Total score results of multi-comparison between groups in terms of grade variable (ANOVA).

Variance source		Total of Squares	Mean of Squares	Std. deviation	F	Sig. (p)	Group Difference
Overall Scale	Between groups	2686.965	671.741	4	3.047	.017*	1-2 (p=.041*)
	Within groups	87524.510	220.465	397			4-2 (p=.048*)
	Total	90211.475		401			
Motivation	Between groups	660.569	165.142	4	7.829	.000*	Prep-2 (p=.000*)
	Within groups	8373.782	21.093	397			Prep-3 (p=.043*)
	Total	9034.351		401			1-2 (p=.000*)
Perseverance	Between groups	1338.837	334.709	4	9.299	.000*	
	Within groups	14289.713	35.994	397			Prep-2 (p=.000*)
							Prep-3(p=.000*)
	Total	15628.550		401			1-2 (p=.001*)
							1-3 (p=.001*)
Lack of self-regulation	Between groups	581.630	145.408	4	3.391	.010*	
	Within groups	17021.733	42.876	397			Prep-3 (p=.009*)
	Total	17603.363		401			
Lack of curiosity	Between groups	749.655	187.414	4	2.033	.089	
	Within groups	36603.343	92.200	397			-
	Total	37352.998		401			

*p<.05.

Variance analysis was done to determine whether the difference observed in the mean scores of the students, as shown in Table 4, is significant or not according to grade level variable. Therefore, comparison and differences between the groups concerning lifelong learning dispositions of students are given in Table 5.

As illustrated in Table 5, a statistically significant difference was found between the groups in terms of the scores of overall scale and sub- dimensions of motivation, perseverance and lack of self-regulation at the level of 0.05. Therefore, the Tukey technique was used as a multi-comparison technique to determine for us which group the difference favored Considering the overall scale, a significant difference was found between the 1st and 2nd grades in favor of the 1st grade (=96.48); the 1st and 4th grades in favor of the 4th grade (=98.14) concerning their lifelong learning dispositions [F(4- 401)= 3.047; p<0,05]. Regarding the motivation sub-dimension, in addition to a significant difference between the preparatory grade (=31.55) and 2nd (=28.16) grade in favor of the preparatory grade; the preparatory grade (=31.55) and 3rd (=29.71) grade in favor of the preparatory grade; a significant difference was found in the scores of the 1st (=31.24) and 2nd (=28.16) grades in favor of the 1st grade [F(4- 401)= 7.829; p<0,05]. While there were no significant differences between the groups

in terms of the scores obtained from the sub-dimension of lack of curiosity, in the scores of the sub-dimenion of perseverance, there was a significant difference between the preparatory grade (=27.44) and 2nd (=23.43) grade in favor of the preparatory grade; the preparatory grade (=27.44)   and 3rd (=25.02) grade in favor of the preparatory grade;   the 1st (=27.10.) and 2nd (=23.43) grade in favor of the 1st grade; and the 1st (=27.10) and 3rd (=25.02) grade in favor of the 1st grade [F(4- 401)= 9.299; p<0,05]. For the sub-dimension of lack of self-regulation, there was a significant difference between the preparatory grade (=14.08) and 3rd grade (=17.19), in favor of the 3rd grade [F(4- 401)= 3.391; p<0,05]. According to these results, it is possible to say that the preparatory and 2nd grade students exhibited lower lifelong learning dispositions than students in the 1st and upper grades.

Findings on age variable

The mean scores and standard deviations of the students' lifelong learning dispositions in terms of age variable are given in Table 6.

The results as seen in Table 6 indicate that the 17-19 age range exhibits the lowest lifelong learning dispositions

Table 6. The descriptive statistical results demonstrating students' lifelong learning dispositions in terms of age variable.

N=402	Overall Scale		Motivation		Perseverance		Lack of self-regulation		Lack of curiosity	
	$\overline{X}$	Sd	$\overline{X}$	Sd	$\overline{X}$	Sd	$\overline{X}$	Sd	$\overline{X}$	Sd
Between 17-19 (n= 162; 40.3 %)	94.75	15.66	29.82	5.15	24.76	6.72	15.56	6.46	24.61	9.55
Between 20-22 (n= 181; 45.0 %)	94.98	14.96	31.12	3.86	26.64	5.59	14.54	6.66	22.69	9.92
Between 23-25 (n= 48; 11.9 %)	96.94	12.92	29.38	5.44	25.88	5.47	16.12	6.97	25.56	8.42
26 and over (n= 11; 2.7%)	96.00	14.10	29.27	5.25	21.91	7.87	18.36	6.37	26.45	11.03

while the 23-25 age range shows the highest dispositions according to the mean scores obtained from the overall scale. As for sub dimensions,(namely, motivation and perseverance), the highest mean scores belonged to the 20-22 age range; in lack of self-regulation and lack of curiosity sub dimensions, the highest scores belonged to the 26 and over age range.

In order to find out whether the mean scores of the groups were significantly different, variance analysis was done. The comparison and the differences between the groups concerning lifelong learning dispositions of the students are given in Table 7.

As given in Table 7, a significant difference was found between the groups in terms of the score of the sub-dimension of perseverance at the level of 0.05. In order to find out in favor of which groups the significant difference occurred, the Tukey test was applied. The results showed that there was a significant difference in the scores obtained from the perseverance sub-dimension between the age range of 17-19 ($\overline{X}$=24.76) and 20-22 ($\overline{X}$=26.64) in favor of 20-22 [F(3- 401)= 3.983; p<0,05]. On the other hand, there were no significant differences between the groups in terms of the scores obtained from the overall scale and the sub-dimensions of motivation, lack of self-regulation and lack of curiosity.

In the light of these findings which revealed that young adult students exhibited higher lifelong learning dispositions than younger students, it is possible to say that lifelong learning dispositions were strongly related to increasing age.

DISCUSSION

The findings made in this study revealed that the English Language and Literature students had high level of lifelong learning dispositions. Overall, the obtained data are parallel to the results of other researches in relevant literature (Demirel and Akkoyunlu, 2010; Oral and Yazar, 2015). Similarly, in a study performed by Özcan (2011), lifelong learning perceptions of English language teachers were found in the "most" competent level (4.04 out of 5). According to the results of the study conducted by Evin Gencel (2013), although perception level of prospective teachers' lifelong learning competences was sufficient, students were found the least competent in communicating in foreign languages. She also found out that English Language Teaching and German Language Teaching students' lifelong learning competencies were at high levels. Ayra and Kösterelioğlu (2015) also found teachers' lifelong learning dispositions to be at high level. On the other hand, in another studies conducted by Kılıç (2014) and Karakuş (2013), the lifelong learning perceptions and competences of students were found to be at the medium level. In contrast to the findings of my study, Coskun (2009) indicated that lifelong learning dispositions of university students were lower than the medium score of the scale which was used in this study as well. However, lifelong learning at university is about the promotion of a "want-to-learn" attitude and the competences to be learned. It focuses primarily on the needs of the learners within their learning context and prompting lifelong learning opportunities (Crosier et al., 2007). In this respect, it is possible to say that students who involved in this study have sufficient motivation or encouragement for active learning that encapsulates the lifelong learning philosophy.

No significant differences were found between the scores of female and male students obtained from both overall scale and all sub-dimensions of the scale. Similarly, in line with this result, Sahin et al. (2010), Şahin and Arcagök (2014), Oral and Yazar (2015) also found no

Table 7. One-Way ANOVA results according to the age variable.

Variance source		Total of Squares	Mean of Squares	Std. deviation	F	Sig. (p)	GD
Overall Scale	Between groups	194.949	64.983	3	.287	.835	-
	Within groups	90016.526	226.172	398			
	Total	90211.475		401			
Motivation	Between groups	201.805	67.268	3	3.031	.029	-
	Within groups	8832.546	22.192	398			
	Total	9034.352		401			
Perseverance	Between groups	455.574	151.858	3	3.983	.008*	17-19 and 20-22
	Within groups	15172.975	38.123	398			
	Total	15628.550		401			
Lack of self-regulation	Between groups	242.771	80.924	3	1.855	.137	-
	Within groups	17360.593	43.620	398			
	Total	17603.363		401			
Lack of curiosity	Between groups	530.364	176.788	3	1.911	.127	-
	Within groups	36822.633	95.519	398			
	Total	37352.998		401			

*$p < .05$.

significant gender differences in students' lifelong learning scores. However, studies conducted by Demirel and Akkoyunlu (2010), Coskun (2009), Gencel (2013), İzci and Koç (2012) and Kılıç (2014) revealed gender differences in lifelong learning scores of students in favor of female students. On the other hand, in the 2006 UNESCO report which described unequality of participation in lifelong training, gender was analyzed as one of the fundamental variables, but large differences between the male and female participants were not found by Desjardins et al. (2006). Likewise, in some studies on gender differences in lifelong learning training conducted by Arulampalam et al. (2004) and Burgard (2012), the participation of women was found to be no less or even slightly more likely in lifelong learning training than men. Aside from these findings, in some studies done by Bassanini and Brunello (2008), and Green (1993), women were found to participate in lifelong learning training more often than men did; while in contrast, Royalty (1996) and Tharenou (2001) found that women participated less than men did.

On the grade level variable, this study revealed that while the 2nd grade participants showed lower level lifelong learning dispositions, the upper grade students (4th grade) were clearly above average in exhibiting lifelong learning dispositions according to the scores obtained from the overall scale. A significant difference between the 1st and 4th grade students resulting in favor

of the 4th grade was also observed in the scores obtained from the overall scale. This result is in line with findings of Demirel and Akkoyunlu (2010), Coskun (2009) and Karakuş (2013). They indicated a significant difference between 1st grade students and senior students in favor of senior students. Similarly, in a study done by by Yavuz Knokman and Yelken (2014b), students' attitudes toward learning were investigated and according to grade level, students in the 4th grade were found to be more eager to learn than those in the 1st grade. It can be so because being too close to their careers, 4th grade students are more enthusiastic to acquire new knowledge and skills. Aktürk (2012) associated students' being open to learning and having high expectations with their learning needs and improvement quests. On the other hand, Oral and Yazar (2015) revealed that 3rd grade students had the highest lifelong learning perceptions among students in the 1st, 2nd, 4th and 5th grades. However, Atacanlı (2007) investigated medical students' lifelong learning behavior changes across years in his study and found no differences in terms of grade levels.

According to the scores obtained from perseverance sub dimension, there was a significant difference regarding the age variable between the age range 17-19 and that of 20-22 in favor of the latter. In addition, this study revealed that students in the age range of 23 and 25 exhibited the highest lifelong learning dispositions

while students at the age range of 17-19 showed the lowest. This finding is consistent with the result of grade variable in that lifelong learning scores were higher for upper grade students than for lower grades. A nearly similar result was obtained by Kılıç (2014), who found out that students in the age range between 25 and over showed the highest lifelong learning perceptions. It is clear that an increase in lifelong learning disposition is associated with increasing age of students.

Conclusion

In knowing a foreign language, especially English as a lingua franca which is one of the significant factors affecting lifelong learning competencies, English Language and Literature students are expected to enrich their lifelong learning experiences and therefore, participation of students who study foreign languages in exchange programs like Erasmus should be increased in order to enable them to gain experiences from learning situations and to develop lifelong learning opportunities as well. In addition, lifelong learning related activities and projects should be included in foreign language students' education programs. More extensive research to deter-mine lifelong learning dispositions of foreign language students is also suggested for future researchers.

Conflict of Interests

The author has not declared any conflicts of interest.

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Full Length Research Paper

An examination in Turkey: Error analysis of Mathematics students on group theory

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Turkey.

The aim of this study is to analyze the mistakes that have been made in the group theory underlying the algebra mathematics. The 100 students taking algebra math 1 class and studying at the 2nd grade at a state university in Istanbul participated in this study. The related findings were prepared as a classical exam of 6 questions which have been presented by 3 academic members working at the same university and these questions were presented to the students accordingly. After findings were put into codes as Correct/Wrong answers, solutions coded as "Wrong" were analyzed according to the content analysis method. Classifying the mistakes made in the solutions by students, suggestions about how to rectify these mistakes were carefully offered.

Key words: Math Training, Group Theory, Learning Disabilities.

INTRODUCTION

One of the meanings of the mathematical thinking is of course abstract thinking. Lacking the amount of the individuals who have the ability of abstract thinking may result in a problem while trying to keep up with a contemporary world (Cucen and Erturk, 2008). The lesson of the mathematics is the most important basic lesson inside the developed societies who have already discovered this detail (Kahramaner and Kahramaner, 2002).

The mathematical branches of the universities consist of analysis, algebra, numbers theory, geometry, applied mathematics, topology, basics of mathematics and the departments of the mathematical logic. Algebra lessons contain just one part of the basic capabilities which have been expected from the students studying at the mathematics department. That is, the student who graduated from mathematics section has already obtained the basic

knowledge of algebra. Because, it is thought that algebra is a basic bridge while accessing to the higher level of the mathematics (James, 2000). Algebra lesson has some missions, such as finding the common features of the algebraic structures, trying to find extra results from these results and making classifying operations on these structures. As a result of this, the algebra which has been instructed at the universities has been called as "Abstract Algebra" by some researchers as well as some educators. The first subject of the algebra instructed at the university is the theory of group. The problem in understanding of the situations of being a group has been resulting in another problem during the conception of "ring" and "substance" situations of the next structures. The first concept, which has to be known just because of the fact that these concepts have been correlated with each other, is to make a decision whether a set is a group or

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not.

Definition of the Group Theory: There has to be a set, which is different from the empty set and an operation which has to be defined on this set, in order to compose a group. In addition, the below detailed three features have also to be provided:

1. The first feature in order to compose a group is associative feature, i.e. for each x, y, z ∈ G

$x \star (y \star z) = (x \star y) \star z$

2. A group has to have an effect-less element in order to be called as a group.

By means of calling e as an effect-less element, for each x ∈ G, the equation is provided:

$e \star x = x \star e = x$

3. A y element exists in each group, (Nesin, 2014):

$x \star y = y \star x = e$

Identify learning disabilities and reasons

Knowing the difficulties confronted by students on any subject is an important first-step for the researches on learning. Synthesizing such data with the latter studies and establishing a connection with it, will be regarded as a crucial base on regulating the following curriculums and composing the teaching model (Rasmussen, 1997). Yetkin (2003) stated that improving cognition at math is an important but a difficult aim. He stated that being aware of the learning disabilities of the students and the reasons for these disabilities in order to design a teaching method and rectify them accordingly are the most important steps for achieving this aim.

By examining the studies for revealing the learning disabilities on different subjects of math according to the findings of the studies of Baker (1996), Moore (1994), Tall (1993), Tall & Razali (1993), Artigue (1990), Weber (2001), Ersoy & Erbas (2005) and Durmus (2004), the reasons of learning disabilities can be collected under these titles:

Concepts Being in Abstract Structure; Concepts being subtract means students being unable to think abstractly, unable to interpret verbal expressions (cannot formulate mathematically).

Deficiencies in Mathematics Education; Deficiencies in transferring main concepts to the students inadequately, their definitions, their images in mind, their usage, rote learning, lack of motivation, being unable to inform the students with the knowledge why mathematical operations are needed and where they will use it.

Student's Deficiencies in Proof and Axiomatic Method; Student's deficiency at the level of readiness, commencing in proof (perception ways of math and proof), students' ways which they use in proof, being in the form of sampling rather than being conception, students' awareness of knowledge essential for proofing and still having difficulty in the proof.

In addition to the above reasons, let us touch on briefly the research of Weber (2001): In his study, which he made to reveal the deficiencies of students' learning while they are creating any proof of theorem in the field of abstract algebra, he asked each student who joined to the research, to prove 7 theorems about group homomorphism by expressing their thoughts vocally. Each of the proof trials was coded as;

1. Correct (participant created a valid proof)
2. Failure to contact knowledge (participant has the required knowledge but he cannot apply this knowledge into creating a proof)
3. Inadequate knowledge (participant does not have the required knowledge to create any proof of theorem)
4. Logical error (participant has a faith in creating a proof but the proof is invalid)

At the end of his study, he found out that having the perception and knowledge which form a proof in group homomorphism is not adequate to create proof. Especially, most of the university students are often being aware of the knowledge needed to prove an expression, but however, their deficiency in creating a proof was still overwhelming.

But Barnett (1999) took a different way to determine the learning deficiencies in his research and he pointed out that this way is much more measurable. Barnett (1999) emphasized on the facts in his study that the best way to determine what the students understand is asking True/False questions. That is, the aim of these questions is to draw an attention to the important features of the concept itself rather than misleading students. He expressed that written explanations to True/False questions are much more important in determining students' mistakes and learning disabilities than the answers to the multiple choice questions which are answered with just one choice. Barnett also emphasized on the fact that an inadequate explanation for a right answer would be much less reliable than a good explanation for a wrong answer.

METHOD

Research design

The related study has been carried out with a descriptive survey model among qualitative research models that have been expected to be examined variably within its own borders of a current situation.

Research population and sample

A group of 100 students at the 2nd class, who studied Algebra Math-1 at the Department of Mathematics in the Faculty of Arts and Sciences of a state university in Istanbul for the 2011-2012

academic years, constituted the population of the research itself. These students had been graduated from a high school formerly and studied at the 2nd class of mathematics department. Algebra Math-1 is taught in the 2nd class (third semester) and their knowledge related to the group theory was the same as the one they have obtained from their Algebra Math-1 course accordingly.

Data collection tool

The required data is collected by researchers by means of applying the below items prepared by 3 academic members, who are expert in their field, teaching at the same university and dealing with the students who study Algebra Math.

1. Do the following sets compose of a group according to the processes defined over them. Explain the reasons.

(a) $(\mathbb{R}^+,*)$; $a*b = \sqrt{ab}$
(b) $(\mathbb{R}^-,*)$; $a*b = \sqrt{ab}$
(c) $(\mathbb{R}^+,*)$; $a*b = \dfrac{a}{b}$
(d) $(\mathbb{R}^-,*)$; $a*b = \dfrac{a}{b}$

2. Which of the following is true and which of the following is false? Explain the reasons.

a-) Empty set is a group.
b-) There is only one solution to the equation defined as a*x*b=c in a group.
c-) A finite goup which has maximum 3 items is an Abelian group.
d-) Each social group is also a group under the multiplication.
e-) Each group has minimum 2 subgroups.

3. Show that the group equalizing $\forall a \in G$ for $a^2 = e$ is an Abelian group.
4. There are 8 groups given below. Sort these groups by subgroup relations in a particular way that no groups remain out.

$G_1=(\mathbb{Z},+)$
$G_2=(12\mathbb{Z},+)$
$G_3=(\mathbb{Q}^+,$.)
$G_4=(\mathbb{R},+)$
$G_5=(\mathbb{R}^+,$.)
$G_6=\{\prod^n | n \in \mathbb{Z}\}$, under multiplication
$G_7=(3\mathbb{Z},$ +)
$G_8=\{6^n | n \in \mathbb{Z}\}$, under multipication

5. Groups given below;

a-) Search whether it is subgroup of $(\mathbb{C}, +)$group or not.
i. $\prod\mathbb{Q}$
ii. $\{\prod{}^{\ n} | n \in \mathbb{Z}\}$
b-) Search whether it is subgroup of $(\mathbb{C} -\{0\}, .)$ group or not.
i. including $i\mathbb{R}$; $i\mathbb{R} =\{ia \mid a \in \mathbb{R}, i^2 = -1\}$
ii. $\{\prod^n | n \in \mathbb{Z}\}$

6. Including $a * b = a^b$ is the set of odd integers a group under * operation? Explain please.

a-) Search whether it is subgroup of $(\mathbb{C}, +)$group or not.
i. $\prod\mathbb{Q}$
ii. $\{\prod^n | n \in \mathbb{Z}\}$
b-) Search whether it is subgroup of $(\mathbb{C} -\{0\}, .)$ group or not.
i. including $i\mathbb{R}$; $i\mathbb{R} =\{ia \mid a \in \mathbb{R}, i^2 = -1\}$
ii. $\{\prod^n | n \in \mathbb{Z}\}$

Analysis of data

When the data were analyzed, students' answers were coded as Right or Wrong. Then examining the wrong answers was performed by content analysis method. According to this action, it was categorized referring to common denominator of students' mistakes.

FINDINGS

1st and 2nd Question's Analysis: Determining whether it forms a group by checking the group axioms.

'Do the following sets compose a group according to the processes defined over them? Explain the reasons.'

We wanted to survey whether the students learnt the group axioms in this question. We observed that most of the students memorized the group axioms (closure, associativity, neutral element, inverse element) but they could not analyze them.

Option a: $(\mathbb{R}^+,*)$; $a*b = \sqrt{ab}$

In this question, students said that $\mathbb{R}^+$ was closed under * operation, as $\forall a,b \in \mathbb{R}^+$ for $a*b = \sqrt{ab} \in \mathbb{R}^+$ but, it did not prove associativity as $\forall a,b,c \in \mathbb{R}^+$ for $(a*b)*c \neq a*(b*c)$. Therefore, it was not a group (Table 1).

We categorized the mistakes into two groups on this question. In the 1st Category, students listed the group axioms but they accepted them "Correct" without sufficiently analyzing it. In short, they accepted that associativity was proved without analyzing. In the 2nd Category, while they were examining the associativity ,students controlled whether $\forall a,b,c \in \mathbb{R}^+$ for $(a*b)*c \in \mathbb{R}^+$ instead of proving $\forall a,b,c \in \mathbb{R}^+$ for $(a*b)*c = a*(b*c)$. The result we found is that the students could not comprehend the required associativity.

The 1st category of students' answer

1. Do the following sets compose of a group according to the processes defined over them? Explain the reasons.

a) $(\mathbb{R}^+,*)$; $a*b = \sqrt{ab}$ composes of a group
I) $\forall a,b \in \mathbb{R}^+$ for $\sqrt{ab} \in \mathbb{R}^+$ provides closure
II) provides associativity
III) there is inverse element since O is not involved in set $\mathbb{R}^+$
IV) "t" is unit a element

The 2nd category of students' answer

1. Do the following sets compose of a group according to the processes defined over them? Explain the reasons.

Table 1. Performance of the students for the 1st question with the option "a".

No of Question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question	Percentage of wrong category 1	Percentage of wrong category 2
1. a.	10	10	80	62	18

Table 2. Performance of the students in the 1st question with the option "b"

No of question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question
1. b.	42	12	46

Table 3. Performance of the students in the 1st question with the option "c".

No of question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question	Percentage of wrong category 1	Percentage of wrong category 2
1. c.	14	12	74	56	6

a) $(\mathbb{R}^+,*)$; $a*b = \sqrt{ab}$

Option b: $(\mathbb{R}^-,*)$; $a*b = \sqrt{ab}$

Students should have stated at this question that the set could not have been in the group since the given set was not close under this operation. But, most of them accepted that this set proved the closure axiom according to this operation and they started to examine the other axioms. Mistake which was made was common (Table 2).

Students' answer

1. Do the following sets compose of a group according to the processes defined over them? Explain the reasons.

b) $(\mathbb{R}^-,*)$; $a*b = \sqrt{ab} \rightarrow$ is a group (a,b $\in \mathbb{R}^-$ when ab> O $\in \mathbb{R}^-$)
Option c: $(\mathbb{R}^+,*)$; $a*b = \frac{a}{b}$

Since this question is similar to the option a, mistakes made were similar to each other. Therefore, mistakes made accumulate upon the same category. In the 1st Category, students listed the group axioms but they accepted them correct without analyzing it. In the 2nd Category, there were mistakes proceeded from lacking of learning the required associativity (Table 3).

1st category of students' answer

1. Do the following sets compose of a group according to the processes defined over them? Explain the reasons.

$(\mathbb{R}^+,*)$; $a*b = \frac{a}{b}$ Set features are provided, it should be b =0
Not problem for $\mathbb{R}^+$

2nd category of students' answer

1. Do the following sets compose of a group according to the processes defined over them? Explain the reasons.

c) $(\mathbb{R}^+,*)$; $a*b = \frac{a}{b}$ 1) $\forall$ a,b $\in \mathbb{R}^+$ for $a*b = \frac{a}{b} \in \mathbb{R}^+$
2)$\forall$ a,b $\in \mathbb{R}^+$ for ($a*b)*c =(\frac{a}{b}*c) = \frac{a}{bc} \in \mathbb{R}^+$
3) $\forall$ a,b $\in \mathbb{R}^+$for c$\in \mathbb{R}^+$ should be found as c$\in \mathbb{R}^+$ a*a=a
$a*c= \frac{a}{c}$ =a   a=2$\in \mathbb{R}^+$
Since a*a=a =......???? not group

Option d: $(\mathbb{R}^-,*)$; $a*b = \frac{a}{b}$

There is only one type of mistake at this question, which resembles to the option b regarding to the error analysis, is that it is examining the other group axioms before looking closure axioms (Table 4).

Students' answer

1. Do the following sets compose of a group according to the processes defined over them? Explain the reasons.

$(\mathbb{R}^-,*)$; $a*b = \frac{a}{b}$ is not a group, it has not got any unit

Table 4. Performance of the students in the 1st question with the option "d".

No of question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question
1. d.	50	20	30

Table 5. Performance of the students in the 2nd question with the option "a".

No of Question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question
2. a.	68	16	16

Table 6. Performance of the students in the 2nd question with the option "b".

No of question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question
2. b.	44	44	12

Table 7. Performance of the Students in the 2nd Question with the option "c".

No of Question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question
2. c.	22	46	32

element.

2nd Question Analysis: True/False questions

Which of the following is true,and which of them is false? Explain the reasons.
a-) Empty set is a group.

We wanted to measure whether students know that a set must include at least neutral element to be a group. Mistakes made were resulted from ignoring this condition (Table 5).

b-) There is only one solution to equation defined as a*x*b=c in a group.

Since each binary operation is sufficiently defined, equation given has one solution. Students generally gave right answers to this question, but none of them successfully explained its reason (Table 6).

c-) A finite group which has maximum 3 items is an Abelian group.
   We wanted students to make comments on the set given overtly (Table 7). Since a group needs to include at

least the neutral element by definition; we wanted them to see each items as an Abelian as follows:

1- element group {e};
2- element group {e, a };
3- element group {e, a, a^{-1}}

We have assumed that the students who gave correct answers could give coincidental answers since there was not any satisfactory explanation.

d-) Each social group is also a group under multiplication.

Each set can be a group or not according to the operation defined over it. Being additive does not require being multiplicative or vice versa. Most of the students answered the question itself correct (Table 8).

e-) Each group has minimum 2 subgroups.

Most of the students stated that a group had at least two subgroups and they were trivial subgroups ({e} itself). The group itself could be {e} was ignored. In these circumstances, the subgroup of the group is only {e} and there is just one (Table 9).

Table 8. Performance of the Students in the 2nd Question with the option "d"

No of Question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question
2. d.	74	22	4

Table 9. Performance of the students for the 2nd question with the option "e".

No of Question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question
2. e.	50	24	26

Table 10. Performance of the students for the 3rd question.

No of Question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question	Percentage of wrong category 1	Percentage of wrong category 2
3	34	28	38	12	30

Students' answer

2- a-) T_ Empty set is a group. -> provides closure, associativity -> group itself, inverse itself

b-) F_ There is only one solution to equation defined as a*x*b=c in a group.

c-) F_ A finite group which has maximum 3 items, is an Abelian group.

d-) F_ Each social group is also a group under multiplication.

e-) T_ Each group has minimum 2 subgroups. 1- Empty set 2- Itself

3rd Question Analysis: $\forall a \in$ **G for** a^2 **= e is an Abelian group**

We wanted to measure students' approaches to the proof questions at this question and we categorized their mistakes into 2 groups in general (Table 10). In the 1st category, students reached this statement by looking at the statement they need to gain it as a result of proof. Proving as it is is out of question. In the 2nd Category students did some operations ignoring even what they had to prove after they had started to prove. While analyzing the error analysis of this question, their lack of knowledge has been observed in terms of not using the given data appropriately and we have reached to right conclusion by this way.

1st category students' answer

3-Show that the group equalising $\forall a \in$ G for a^2 = e is an

Abelian group.

for $\forall a$,b $\in$ G if ab=ba it is Abelian

aab=aba

b=aba

ba=abaa

ba=ab

2nd Category Student Answer

3- Show that the group equalising $\forall a \in$ G for a^2 **= e** is an Abelian group.

a and b

$$a^2 = e b^2 = e$$

ab = ba

e = e

4th Question's Analysis: Ordering of Groups

3- There are 8 groups given below. Sort these groups by subgroup relations in such a way that no groups remain out.

$G_1 = (\mathbb{Z},+)$

$G_2 = (12\mathbb{Z},+)$

$G_3 = (\mathbb{Q}^+,$.)

$G_4 = (\mathbb{R},+)$

$G_5 = (\mathbb{R}^+,$.)

$G_6 = \{\prod^n | n \in \mathbb{Z}\}$, under multiplication

$G_7 = (3\mathbb{Z},$ +)

$G_8 = \{6^n | n \in \mathbb{Z}\}$, under multiplication

We wanted to see students to show the groups as S< G under the same operation, when the condition of S⊂G was proved. Mistakes, which were often made, were just because of intensifying on two categories. In the 1st

Table 11. Performance of the students in the 4th question.

No of Question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question	Percentage of wrong category 1	Percentage of wrong category 2
4	4	50	46	30	20

Table 12. Performance of the students in the 5th question with the option "a.i".

No of Question	Percentage of correct-answered question	Percentage of unanswered question	Percentage of wrong-answered question
5. a. i.	6	84	10

Category, students emphasized on subgroup connection between multiplicative and additive groups, but such an equation was not possible. In the 2nd Category students compared the G_6 and G_8 groups which were not each other's subgroup according to the subgroup relation. These groups could not be each other's subgroups by definition (Table 11).

1st Category students answer

3- There are 8 groups given below. Sort these groups by subgroup relations in such a way that no groups remain out.
$G_1=(\mathbb{Z},+)$
$G_2=(12\mathbb{Z},+)$
$G_3=(\mathbb{Q}^+,$.)
$G_4=(\mathbb{R},+)$
        $G_4>G_5>G_3>G_6$
$G_5=(\mathbb{R}^+,$.)
$G_6=\{\prod^n|n\in\mathbb{Z}\}$, under multipication
        $G_1>G_7>G_2>G_8$
$G_7=(3\mathbb{Z},$ +)
$G_8=\{6^n|n\in\mathbb{Z}\}$, under multipication

2nd Category Student Answer

There are 8 groups given below. Sort these groups by subgroup relations in such a way that no groups remain out.
$G_1=(\mathbb{Z},+)$
$G_2=(12\mathbb{Z},+)$
        $G_2>G_7>G_1>G_4$
$G_3=(\mathbb{Q}^+,$.)
$G_4=(\mathbb{R},+)$
        $G_8>G_6>G_5>G_3$
$G_5=(\mathbb{R}^+,$.)
$G_6=\{\prod^n|n\in\mathbb{Z}\}$, under multipication
$G_7=(3\mathbb{Z},$ +)
$G_8=\{6^n|n\in\mathbb{Z}\}$, under multipication

Analysis of Question 5: Determining subgroup

We wanted the students to examine the condition of being subgroup ($a.b^{-1}$). They had to be carefull about the element they chose from the additive and multiplicative groups as they examine that condition (a-b for additive group; $a.b^{-1}$ for multiplicative group)

a-) Search whether it is subgroup of $(\mathbb{C},+)$group or not;

Option i : $.\prod\mathbb{Q}$

Students fell into an error which was mentioned above (Table 12), thus they examined a-b instead of a.b^{-1}.

Students' answer

a-) Search whether it is a subgroup of $(\mathbb{C},+)$group.
if a.b^{-1} S<G let's look
i. $\prod\mathbb{Q}$ $=\prod\frac{a}{b}$ $.(\prod\frac{c}{d})^{-1}=$......................???
because no T , not subgroup
Option ii: $\{\prod^n|n\in\mathbb{Z}\}$
Some of the mistakes made on this question are of the type of option i again. Another common mistake was choosing the elements to be examined correctly, but claiming $\prod^k-\prod^l$ expression was the element of the set which was previously given (Table 13).

Students' answer

Search whether it is a subgroup of $(\mathbb{C},+)$group.

i. s   a-b ∈ S when   aı b∈ S?
ii.S$\{\prod^n|n\in\mathbb{Z}\}\prod^k,\prod^l$ ∈ S
k>l $\prod^k-\prod^l$ $=$ $\prod^l$ $[\prod^{k-l}$ -1] ∈ S   l>k $\prod^k-$
$\prod^l$ $=\prod^k(1-\prod^{l-k})$ ∈ S   → subgroup

b- Search whether it is a subgroup of $(\mathbb{C}-\{0\}, .)$ group.
Option i: i$\mathbb{R}$

Table 13. Performance of the students in the 5th question with the option "a.ii".

No of question	Percentage of correct question	Percentage of unanswered question	Percentage of wrong-answered question
5. a. ii.	2	88	10

Table 14. Performance of the students in the 5th question with the option "b.i"

No of Question	Percentage of Correct-Answered Question	Percentage of Unanswered Question	Percentage of Wrong-Answered Question	Percentage of Wrong Category 1	Percentage of Wrong Category 2
5. b. i.	2	82	10	4	4

Table 15. Performance of the students in the 5th question with the option "b.ii"

No of Question	Percentage of Correct-Answered Question	Percentage of Unanswered Question	Percentage of Wrong-Answered Question
5. b. ii.	8	92	0

Table 16. Performance of students in the 6th question.

No of Question	Percentage of Correct-Answered Question	Percentage of Unanswered Question	Percentage of Wrong-Answered Question
6	2	88	10

We collected the mistakes made on this question under two titles. 1st Category was consisted of the mistakes arising from not to able to find the reverse of an element taken from the set according to the multiplication (Table 14). 2nd Category consisted of the false results arising from finding the multiplication reverse of an element taken from the set but it was not to be able to write $a.b^{-1}$ as -1 instead of i^2 in the expression given as a result to operation $a.b^{-1}$.

1st Category Students' Answer

5. including $i\mathbb{R}$; $i\mathbb{R} =\{ ia \mid a \in \mathbb{R}, i^2 = -1 \}$
Search whether it is a subgroup of $(\mathbb{C}, +)$group.

2nd Category Student Answer

b- Search whether it is a subgroup of $(\mathbb{C}, +)$group.
i - Including $i\mathbb{R}$; $i\mathbb{R} =\{ ia \mid a \in \mathbb{R}, i^2 = -1 \}$
x,y $\in i\mathbb{R}$ x.y^1 $\in \mathbb{R}$ i.a $(\frac{i}{b}) = -i^2 . \frac{a}{b} \in i\mathbb{R}$
Option ii : $\{\prod^n \mid \boldsymbol{n} \in \mathbb{Z} \}$
   Students who answered this question did not make any mistake (Table 15).

Analysis of 6th Question: Whether $a * b = a^b$ is a group.

Including a $* b = a^b$, is the set of odd integers a group under * operation? Explain please.

We wanted to see to be shown closure axiom was not proved since $a^b \notin T$ for each $\forall a$, b $\in \mathbb{Z}$ as the odd integers set is $T= \{....,-3,-1,1,3,....\}$. But most of the students stated that the closure was proved, because they assumed the T set as it is the only odd positive integers set (Table 16).

Students' answer

3- Including a $* b = a^b$, is theset of odd integers a group under * operation? Explain please.
$\{....,-3,-1,1,3,....\}$ =T   3x5 $=3^5 =$ T
1x3 $=1^3= 1$ $\Rightarrow$ 5x7=5^7 $\Leftarrow$
1x5 $=1^5 = 1$ =T $\rightarrow$ $(odd)^{odd}$ = odd   odd.odd=odd
 Since it is close,* is a group

DISCUSSION

While students were expected to show the given

operation as well-defined, they passed on to decision making process without any question. It could be said that the students preferred to copy rather than to think abstractly when we consider that they attended to the university as a result of test exam, i.e. the central exam system (Soylu and Isik, 2008). It sounds believable that they could have just memorized the rules of theory without internalizing the descriptions. Trying to proving the group axioms without thinking on descriptions is a sign of rote learning based education system. Whether a cognitive teaching has been done on the algebraic structures or not has not been known. Unless we internalize the meanings of the concepts covered with the different learning methods, mastering on a subject by rote will come into the question. Using computer programmes, e.g. computer algebra system CBS), will provide convenience but, are there any academic members applying to the computer programmes or how are their perspectives to these embodying processes? Doing a scientific research by academic members about this matter, their opinions and their approaches could be significantly useful.

The questions, which measure whether definitions and features of algebraic structures are learnt, are generally measure proving, reasoning, and discernment ability. Individuals experience many problems in their daily life and they think mathematically to solve their problems. Actions like explaining a proposition, saying why it is right or wrong and choosing and using different logical thinking ways and proving types, present individual's ability on mathematical thinking. In this sense, the students of the mathematics department are supposed to use their ability of mathematical thinking and to let the operations they do make sense. Mistakes made by students, who participated in the study, came up as a result of either misunderstanding the conditions of group theory or examining these conditions wrong. Some challenges could be experienced during the learning process but the matter is to identify them correctly and to enhance various methods to deal with them. Having difficulties at the learning abstract concepts is the most important one. Students can apply to rote learning in order to overcome this difficulty, but they can have difficulty in practice at this time. For example, student lists the axioms (closure, associativity, inverse element, neutral element) while controlling the set whether it is group or not, but he or she makes the operation supposing that the set is closed. In other words, student cannot practice what he or she memorized or could not know what to do in other cases. We have been thinking the fact that this problem traces to the gaps of education which was received in both high school and university years. Students' infrastructure they set up with math training, which they had during their education life up to attending university, has inadequate mathematics they meet at the university. Because throughout their primary and secondary school years, they learn mathematics with its operational aspect, i.e.

they assume that the success at this lesson to be able to perform the operations without using calculator and dealing with just practical solutions in the math exams. However, they meet theoretical mathematics after the gradation from a high school before the college and as a natural result, they are afraid of another learning difficulty, which we thought it arises from the same reasons, is the one which is dealing with proving the theories. While it is rehearsing as if definitions and proofs have no significance at secondary education, the theoretical side of the mathematics is at the forefront at the university, especially at the Algebra Math-1 Class. Students even do not know how to study for this lesson and they are having enormous learning difficulties. Our suggestion to minimize this wavers during this gradation process is to lecture the abstract mathematics, such as logic, proving methods before Linear Algebra and Mathematics Analysis I class, in which the main subjects of the theoretical mathematics have been taken into account.

Conceptual learning has much higher degree of importance in the mathematics education for the students who study at the mathematics department. Unless the students can successfully comprehend algebraic definitions, concepts and structures, they will try to memorize these phenomenons (Soylu and Isik, 2008).

The related suggestions to overcome these above mentioned learning difficulties can be listed as follows by taking the studies of Woerner (1980), Harel (1989), Haddad (1999) and Tatar and Dikici (2014) into consideration; computer programmes can be used, visualization can be referred, appropriate materials can be used, classroom tasks can be carried out, and teaching system can be redesigned in the direction of learning difficulties.

Conflict of Interests

The authors have not declared any conflicts of interest.

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Full Length Research Paper

Effects of leisure education programme including sportive activities on perceived freedom in leisure of adolescents with intellectual disabilities

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The objective of this experimental study is to determine the effect of leisure education programme including sportive activities on the perceived freedom in leisure of adolescents with mild intellectual disabilities. The research was designed with an experimental group (n= 37) and a control group (n= 34), and was conducted among a total of 71 adolescent students with mild intellectual disabilities in the spring semester of the 2014- 2015 academic year. The experimental group participated in a leisure education programme including sportive leisure activities that were supported by leisure coaching for 8 weeks. The short form of the Leisure Diagnostic Battery was applied to all participants as a pre- and post-test. Paired sample t tests and independent sample t tests were used to analyze the statistical data within the study, and the collected data were analysed using the R Project package program. A significant difference was found between the pre- and post-tests of the adolescents with mild intellectual disabilities in the experimental group. Moreover, a significant difference was observed between the experimental and control groups. According to the results, a leisure education programme including sportive activities had a positive impact on perceived freedom in the leisure of individuals with intellectual disabilities.

Key words: Sportive leisure activities, leisure education, perceived freedom in leisure, intellectual disabilities.

INTRODUCTION

Perceived freedom in leisure, which is a reflection of the leisure components in the preparation of adolescents with intellectual disabilities for adulthood, is valued as having an effect on their integration with life and involvement in life. Perceived freedom in leisure (PFL) is defined as a cognitive motivational construct of control over leisure experiences, the satisfaction of leisure needs and the participation in leisure behaviour and global life satisfaction (Ellis and Witt, 1994). Sportive recreational activities can facilitate the process of passing from childhood to adolescence. These activities in self-expression have an influence on the individuality, independence and self-confidence of adolescents. Leisure activities, as a means of socialisation, are crucial for all adolescent groups, as peer communication is substantial during this period. Leisure activities, in which

adolescents with mild intellectual disabilities as well as other adolescents participate, can contribute positively to individual development and integration in their lives. However, participation in such activities may not be easy, as it is accompanied by both the barriers experienced by and the opportunities available to individuals with intellectual disabilities. In this case, a leisure education programme can be planned to enhance the life gaining experiences of individuals with intellectual disabilities. Accordingly, Hoge et al. (1999) stated, in their experimental study, that a leisure education programme including leisure activities has a positive impact on the perceived freedom in leisure of children with intellectual disabilities.

Patterson and Pegg (2008) monitored a development in the level of confidence, skills and self- esteem of adolescents with intellectual disability by participating in leisure activities. Azaiza et al. (2011) and Lifshitz- Vahav et al. (2015) saw that a positive correlation between participation in leisure activities and cognitive functioning supports the importance of participating in leisure activities in order to enhance perceived freedom of adolescents with intellectual disability.

The passage from childhood to adolescence of children who have a high degree self-expression can occur quite easily. Leisure activities can be considered as enhancing autonomy and decision-making skills (Garst *et al.*, 2001), which are crucial for individuals with intellectual disabilities. McGuire and McDonnell (2008) expressed that the relationship between recreation and self-determination highlights that increased time spent by adolescents and young adults participating in recreation creates higher levels of self-determination. That is to say, reaction is a way of improving self-determination, and this concept can be enhanced by experiences, as well as by teaching explicit skills. The participation level of individuals with intellectual disabilities in social and recreational activities has been observed to be lower according to the studies of Braun et al. (2006) and Poulse et al. (2007). Barriers to leisure can complicate the lives of this group, which prefers to participate in individual activities alone instead of being with their peers. In addition, this group may prefer to participate in activities with familiar people instead of strangers. According to Abbels et al. (2008), the majority of these adolescents prefer to participate in activities with their family members because of their disabilities and the lack of available support, instead of peer activities. In their study, which was conducted among 34 adolescent students with medium intellectual disability and designed with a semi-structured interview method, Buttimer and Tierney (2005) confirmed that the participants are mostly home based and passive in nature. The reason for their low participation rate in activities might originate from the scantiness of their participation in the sports clubs that were within the scope of their opportunities; however,

they did participate in walking (Health Promotion Unit, 1996). In the lives of adolescents with mild intellectual disabilities, their inequality of opportunity and economic status, or their need for the help of another person might be barriers to their access to sportive leisure activities (King et al., 2003; Frederick, 2006). That is, one's country and family opportunities can sometimes indirectly hinder one's achievement of many things that are one's right. However, in many countries, life can be easier. Although a disability is a part of the reality of life, such reality should not include the barriers to achieving the rights of an individual, such as: A. Living independently; B. Enjoying self-determination; C. Making choices; D. Contributing to society; E. Pursuing meaningful careers; and F. Enjoying full inclusion and integration in the economic, political, social, cultural, and educational systems of the society (RAA, 1992). Various studies have investigated whether family income is a factor having an impact on participation in leisure activities; in addition, many studies have affirmed that people who have economic disadvantages prefer to participate in leisure activities at lower levels. Bedia et al. (2011) indicate in their study that personal factors and perceived barriers are the main determinants of participation in leisure activities, rather than disability-related factors. Environmental factors are substantial in the generation of opportunity and the enhancement of the self-determination of adolescents with intellectual disabilities. Leisure activities, which present them with opportunities to choose the best among the alternatives in the environment, are a key point in achieving self-determination for those who have developmental disabilities.

In addition, location, as an environmental factor, might be a barrier to participation in sportive leisure activities. The study of Zijlstra and Vlaskamp (2005) found that, among environmental factors, residence modality has an influence on participation in leisure activities, and adults with ID have more limited access to normalised leisure activities, because they prefer to use day centres and their residences. According to Braun et al. (2006), improving daily activities, increasing attendance at postsecondary school and opportunities for competitive employment and participation in impairment-related programmes are facilitators that enhance the types of leisure activities for young adults with disabilities, thereby aiding their development.

Perceived freedom in leisure reflects self-assessments of participation in leisure activities and is affected in this context by life experiences. Individuals, who believe in having more freedom in leisure experiences, tend to exhibit much more efficiency, locus of control and internal motivation (Janke and Diğ., 2010). Considering the importance of these concepts for adolescents with intellectual disability, it is crucial to develop perceived freedom in leisure. Leisure activities are important tools to improve perceived freedom in leisure (Witt and Ellis,

1985, 1986; Ellis and With, 1994; Hoge et al.,1999; Poulse et al., 2007). Primarily, the literature has many studies about physical development of individuals with intellectual disability through participation in sportive physical activities (Graham and Reid, 2000; Frey et al., 2008; Harada and Siperstein, 2009; Hutzler and Korsensky ,2010; Boddy et al., 2015; Hsieh et al., 2015; Einarsson et al., 2015). However, studies on participation in sportive activities by adolescents with intellectual disability willingly, for fun and relaxation are limited.

Although it is known that perceived freedom in leisure has an indirect impact on the life skills of adolescents with mild intellectual disabilities, the number of research studies that are related to sport-based leisure activities, which are an important means of improving them, is quite limited within the national and international literature. In light of this assumption, the objective of this research is to determine the effect of a leisure education programme including sportive activities on the perceived freedom in leisure of adolescents with mild intellectual disabilities.

Research questions

1. Are any differences observed in the perceptions of freedom in leisure between the groups of adolescents with mild intellectual disabilities who participated in a leisure education programme including sportive activities and those who did not?

2. Is there a difference in the perceptions of freedom before and after the participation of the group of adolescents with mild intellectual disabilities in a leisure education programme including sportive activities?

The Hypotheses of the research

H1: There is a significant difference in support of the experimental group regarding 'perceptions of freedom in leisure' between the experimental group, who participated in a leisure education programme including sportive activities and adolescents who participated in the control group.
H2: There is a significant difference in the 'perceived freedom in leisure' before and after the participation of adolescents who were in experimental group in a leisure education programme including sportive activities.

METHODOLOGY

Participants

The standard deviations of the mean of the perceived freedom in leisure (PFL) scores were used to calculate the sample size. The standard deviation of the mean PFL was accepted as 1-point, and

the difference was considered to be the mean PFL score for adolescent groups with mild intellectual disabilities. After an examination of the PFL standard deviations in previous studies, the standard deviation point was taken to estimate for keeping the larger sample size (Hoge et al., 1999; Lapa, 2013; Agyar, 2014). Therefore, it was determined that each group should have at least 16 subjects with a 95 % confidence interval for PFL scores as seen in Table 1. As 71 adolescents with mild intellectual disabilities participated in this study, the results may be generalised to the population. The sample size was calculated using the Minitab Statistical Package Program (Minitab Inc, 2005).

The sample consisted of two groups, the experimental (n=37) and the control (n=34) groups, and students were selected who were mildly mentally retarded. After determining the number, while students were selected for the experimental group from the 9th class students who have attended the school for the mildly mentally retarded in the province of Konya and who were willing to participate in the research, the control group was constituted of students with mild intellectual disabilities who attended a school that includes mixed students with mild intellectual disabilities in the province of Konya. The characteristics of the experimental and control groups can be observed in Table 2.

Experimental design

This experimental study was designed according to the techniques of quantitative research; also pre- test and post- test pattern with control group was used. The aforesaid two schools were selected randomly, and thus, the experimental and control groups were designated. A different school was selected as a control group separately by drawing a number in the same province, because the school selected as the experimental group did not have a sufficient number of students with mild intellectual disabilities to include as a control group. The differences in the pre-tests were not taken into consideration, because the objective of the study was to investigate the effect of a leisure education programme including sportive activities on perceived freedom in leisure. These differences can be caused by the attitudes and approaches of the teachers and executives of the school, and conscious families may prefer the school of the experimental group. In any case, the families in the experimental group have higher education and income levels, as shown in Table 3. The study was conducted in the spring semester of the 2014-2015 academic year.

Experimental procedure (leisure education programme including sportive leisure activities)

A leisure education programme including sportive activities was confected by the literature review and expert opinions, and was scheduled by taking 5 concepts that are concentrated in PFL items. Active and moving leisure activities were conducted among the students during an 8 week period for two hours, two days a week. The study procedure was planned by reviewing previous studies conducted with the same scale in an education programme among similar groups (Zoerink 1988; Zoerink and Lauener 1991; Lovell et al., 1996).

Ultimate care was shown in order to ensure the continuous participation of the students in the programme and the achievement of goals. The study by Hoge et al. (1999) highlights the concepts that are determinants that are useful to have and the perception of freedom in leisure within a leisure education programme, such as leisure appreciation, social interaction and friendship, leisure resources, self-determination and decision-making; the authors also endeavoured to introduce these concepts to the students, whether

Table 1. Sample size calculations for the hypothesis.

	No of questions	Actual Range	Std. Dev.	Previous Surveys Sd	Significant differences Between experimental and control groups	Power	n
Perceived freedom in leisure	17	17-85	1	0.60-0.74	1	0.95	27

Table 2. Demographic characteristics of sample of students in experimental and control groups (n=71) percentage.

		Experimental	Control
Gender	Female	16.2	29.4
	Male	83.8	70.6
Age		16.78	17.5
Primary diagnosis	Mild	100	100
	Non-writing-reading	5.4	8.8
	Primary school	81,1	91.2
Mother education	Secondary school	5.4	0
	High school	4.4	0
	University	2.7	0
	Non-writing-reading	5.4	2.9
	Primary school	70.3	79.4
Father education	Secondary school	16.2	8.8
	High school	2.7	8.8
	University	5.4	0
	Below minimum wage	13.5	5.9
	Minimum wage	48.6	73.5
Income	Twofold of minimum wage	29.7	20.6
	Threefold and over of minimum wage	8.1	0

Table 3. Comparison of pre-test scores of experimental and control groups for perceived freedom in leisure (independent sample t test).

Pre-test	N	Mean	Std. Dev.	Std. Error Mean	t	p
Experimental	37	3.35	0.84	0.0138	9.44	**<0.001**
Control	34	1.98	0.36	0.0620		

they were aware of it or not.

The participants were quite willing and steady during the programme. All participations could involve all sections, since the programme was flexible to the participants.

Leisure Appreciation: In this part of the study, recreation, the definition of leisure activities and sportive leisure activities, the barriers to leisure and the strategies for coping with leisure barriers during crucial activities in our lives were continuously emphasised by the leisure coaches. As an illustration, various sportive leisure

activities were among the activities that were included within the opportunities offered. Also, the students were allowed to share and practice the activities they knew with their friends. Moreover, they were told that spending their leisure time actively and moving enables them to feel mentally and physically well, and the leisure coaches endeavoured to create awareness through the use of a question and answer method in order to note their feelings after the fun activities that occurred each day.

Social Interaction and Friendship: In this unit, propositions and

activities were presented, and activities related to social communication skills and improving friendships were also included. Furthermore, activities that determine the importance of body language in social communication and friend relationships were presented. For instance, the students could collaborate with a friend with whom they had perhaps not engaged in any sharing previously toward a common goal while they were playing volleyball. In addition, they worked to achieve their goals in a sportsmanlike manner, without forgetting that the competitors were their friends. The importance of the message that they received was emphasised by asking about the characteristics that were used in choosing a group of friends.

Leisure Resources: Visits to sportive recreation areas in the region were organised for the participants, and there was an endeavour to create awareness by sharing about the leisure areas visited during the week with their friends and leisure coaches.

Self-Determination: Opportunities for choice-making by the participants were provided during the leisure education programme including sportive activities. In addition, opportunities were given for the students to take responsibility for their activities and for self-expression. As an example, while playing musical chairs, the students, who danced without having to worry about their friends, seemed to relax, with smiles and expressions of excitement on their faces.

Decision-Making: Activities which are aimed at enhancing the decision-making skills of the participants were planned. Instructions related to decision- making were presented by the coaches during the activities. To give an example, on some days, many activities were presented for the participants and a choice was sought from them. They made a decision by considering the possible advantages and disadvantages of their choices, and groups participated in activities by separating themselves. In another play activity, the participants chose the group they would like to join.

Leisure coaching

Leisure coaches, who had previously collaborated groups with intellectual disabilities, helped the participants during the programme. Four coaches, who conducted the education programme, were informed through an orientation programme for four hours. The main objective of the study was shared with the coaches and a meeting was organised weekly on their observations to motivate them. They provided motivation for the group to participate in the programme as amusement, and they stimulated the participants to achieve the goals through conscious guidance during the activities. At the same time, they provided support to the participants to help them fulfill the responsibilities involved in the activities. The leisure coaches enhanced the motivation of the participants through observations of the students and continuous interpersonal communication with them, to enable them to behave independently and to improve their coping skills in dealing with barriers during the activities.

Instrument

The questionnaire consisted of two parts: the 'Personal Information Form' and the 'Short Form-Leisure Diagnostic Battery (Perceived Freedom in Leisure Scale -PFL-)'.

The *Personal Information Form* includes demographic questions such as gender, age, mother and father's education and income.

The *Perceived Freedom in Leisure Scale- PFL:* The Perceived Freedom in Leisure Scale 'Short Form—Perceived Freedom in Leisure' is a section of the 'Leisure Diagnostic Battery' developed for individuals with intellectual disabilities by Witt and Ellis (1985). This version was used for data collection to measure the participants' levels of perceived freedom in leisure. The Perceived Freedom in Leisure scale is a tool for measuring perceived competency in leisure, perceived control and perceived internal motivation. A 5-point Likert scale was rated from strongly disagree (1) to strongly agree (5), and it consisted of a total of 25 items. The Cronbach alpha of the scale was found to be between 0.83 and 0.94. It was adapted into Turkish by Yerlisu et al. (2011), and 17 items were collected. While for that study, the internal consistency coefficient for the general scale was found to be 0.91, in this study, the Cronbach alpha value was 0.96.

Analysis

Frequency and percentage calculations were conducted for the demographic features of the sample group. The distributions of the variables, the normality of the distributions and the homogeneity of the variances were examined, as well as the parametric features of their distribution points. The distributions were normal for the pre-test and post-test total score averages of the experimental and control groups. The pre- and post-PFL total score averages of the experimental and control groups were calculated. The pre- and post-tests of the experimental group were calculated by a paired sample t-test. In addition, the differences between the experimental and control groups were determined via an independent sample t-test.

The statistical significance level was accepted as $p < 0.05$. The R Project package was used for the analysis of the data.

RESULTS

The results of the study are presented by first indicating the research question, and then, by addressing the corresponding hypothesis.

In Table 4, a comparison of the scores for perceived freedom in leisure of the experimental and control groups is shown. Table 4 presents the differences in the pre- and post-tests of the perceived freedom in leisure scale for the experimental groups.

There was a significant difference in support of the experimental group regarding 'perceptions of freedom in leisure' between the experimental group, who participated in a leisure education programme including sportive activities, and adolescents who were the participants in the control group.

There was a significant difference in the 'perceived freedom in leisure' before and after the participation of adolescents who were in an experimental group in a leisure education programme including sportive activities (Table 5).

DISCUSSION

First, in the study, we investigated the effect of a leisure education programme including sportive activities in

Table 4. Comparison of gain scores of experimental and control groups for perceived freedom in leisure for h_1 (independent sample t test).

Post-test	N	Mean	Std. Dev.	Std. Error Mean	t	p
Experimental	37	3.92	0.41	0.068	21.57	**<0.001**
Control	34	2.14	0.26	0.044		

Table 5. Diversity of pre- and post-test scores for perceived freedom in Leisure for h_2 (paired sample t test).

Experimental	N	Mean	Std. Dev.	Std. Error Mean	t	p
Pre-test	34	3.35	0.84		-3.59	0.001
Post-test	34	3.92	0.41			
Control	**N**	**Mean**	**Std. Dev.**	**Std. Error Mean**	**t**	**p**
Pre-test	37	1,98	0.36	0.06	-3.02	0.005
Post-test	37	2.15	0.26	0.04		

which adolescents with mild intellectual disabilities participated, on their perceptions of freedom in leisure. A significant difference was shown between the experimental and control groups; the average scores for the leisure of the experimental group were higher than those of the control group, which did not participate in the programme. This result demonstrates the positive effect of a leisure education programme including sportive activities on the perception of freedom in leisure. In addition, we can note that the participants became aware of the definition of leisure and resources; in addition, the skills of friendship, social communication, decision-making and self-determination were enhanced.

A high score of perceived freedom in leisure, as determined by the Leisure Diagnostic Battery, addresses high perceived leisure competence, perceived leisure control, recognition that highlights the need and desire for leisure satisfaction and a high level of participation in leisure activities.

This result is parallel to that found in a study which was conducted among adolescents with mild intellectual disabilities who participated in a leisure education programme. Although Hoge et al. (1999) could not find any significant differences between the pre-tests of the experimental and control groups, a significant difference between their post-tests was found, which supported the experimental group. In light of these results, five concepts that were included in the leisure education programme that was conducted by Hoge et al. have a positive impact on the perception of freedom in leisure. In that study, it was observed that adolescents with mild intellectual disabilities who actively participated in recreational activities presented high scores in self-determination (confidence). Accordingly, recreational activities are a

crucial means for the enhancement of self-determination skills. This assumption is actualised as it is indirectly related to high PFL scores.

Secondly in the light of my study results, for adolescents in the experimental group who participated in the sportive leisure activities programme, perceived freedom was examined before and after the programme. Higher scores were observed after the sportive leisure programme than in the pre-test scores of experimental group with mild intellectual disabilities; this increase is stated to be statistically significant. In a similar study that was conducted by Hoge et al. (1999), the perceived freedom in leisure scores of the experimental group, before and after the leisure education programme, were shown to have increased; however, this increase was not found to be statistically significant. Although the leisure education programme, which was conducted using leisure coaches for 18 weeks, three hours per week, was not shown to result in a significant difference in experimental group, there was a statistically significant difference in the control group.

The leisure education programme including sportive activities conducted by the researcher in the current study is characterised by a basic difference from the leisure education programme conducted by Hoge et al. (1999): physical mobility. Play that includes the education ladder of sports, such as table tennis, volleyball, basketball, athletics, etc., as well as traditional play, was conducted for 8 weeks, for two hours a day, two days a week, as planned.

The participants were eager and motivated during the programme. The reason is two hours was used for amusement. The positive interaction between the coaches and participants is another reason.

If an education programme and a leisure education programme including sportive activities are compared in terms of efficiency, a mobility-based sportive leisure activity programme seems to be more effective in enhancing perceived freedom in leisure.

In their study, Abbels et al. (2008) stated that adolescents with intellectual disabilities participate in various activities, such as sports teams or youth group activities, with their counterparts. It is important to plan such activities, considering the influence of friend relationships and socialisation on perceived freedom in leisure.

Although the participation of adolescents with intellectual disabilities in recreational physical activities is substantial, their participation rate is lower than their counterparts who do not have any mental disorders (Cairney et al., 2005; Poulse et al., 2006). Previous studies have demonstrated that individuals with mild intellectual disabilities prefer their families as opposed to their counterparts (Pretty et al., 2002; Solish et al., 2003)

Studies in the literature highlight that they choose to participate in activities in which they can be successful, such as leisure activities. This is associated with leisure opportunities and the generation of opportunities. Buttimer and Tierney's (2005) study indicates that the 'access to' and 'location of' leisure facilities are identified as barriers to leisure by both students and parents.

Finally, the reason for the significant difference between the pre- and post-tests of the control group may be the differences that occurred in the pre-test. The reason can be related to the awareness of PFL questions as associated with informing the participants about the subject before using the PFL instrument.

CONCLUSION AND RECOMMENDATIONS

We can state that a leisure education programme including sportive activities has a positive impact on the perceived freedom in leisure of individuals with mild intellectual disabilities. There are a limited number of research studies in the literature that even reflect the positive impact of leisure education programmes on the life skills of individuals with intellectual disabilities (Zoerink, 1988; Bedini et al., 1993; Mahon, 1994; Lovell et al., 1996; Williams and Dattilo, 1997; Hoge et al., 1999; Sivan and Stebbins, 2011). For this reason, sport and amusement-based leisure activities that allow groups with intellectual disabilities to feel perceived freedom should be planned and provided in order to enhance the integration of these groups with society, and they should be included in the national and international literature. A programme based on leisure in education programmes for individuals with intellectual disabilities has not been conducted in Turkey. The sustainability of current active leisure programmes would be a positive development for the students.

Long-term leisure education programmes including sportive activities, which are an important reflection of the components of leisure experiences, are suggested for future research in order to enhance the effectiveness of these programmes. Moreover, it could be a better contribution to the literature, by planning a qualitative study about the evaluation of efficiency of the programme.

Conflict of Interests

The author has not declared any conflicts of interest.

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Full Length Research Paper

Turkish EFL pre-service teachers' pronunciation problems

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This classroom research deals with pronunciation problems that Turkish EFL teacher candidates would encounter. The participants were 22 EFL pre-service teachers with B2 level of proficiency in English. The presentations which were carried out by these participants were analyzed both by the participants themselves and the researcher. The results revealed a dominant mispronunciation of the sound schwa /ə/ along with other sounds such as theta /θ/, engma /ŋ/ and /æ/. The absence of the corresponding sounds of /θ/ and /æ/ in Turkish could be deemed the reason for such pronunciation problems, but the case is not that straightforward for schwa /ə/ as in Turkish vowel inventory there seems to be a similar /ɯ/ sound. This situation brought about the question whether there could be different phonemic dynamics for the sounds schwa /ə/ in English and /ɯ/ in Turkish.

Key words: Pronunciation problems, theta, schwa, engma, EFL pre-service teachers.

INTRODUCTION

Among the universal levels of language, phonology of one's mother tongue is possibly the most difficult one to unlearn. In an attempt to learn a foreign language, an individual can tackle with the most basic syntactic demands of the target language within a relatively short time.

The rationale of semantics, another universal aspect of language, is also not a problem most of the time. On the other hand, pragmatic conventions of a target language are generally problematic especially if the gap between the target and the native culture is big, but these conventions are again learnable.

However, when the topic is the attempt to learn the phonology of a particular foreign language, many of the phonetic dynamics of the mother tongue have to be sidelined. This is where most perceptible problems about

foreign language learning set in. It is very difficult to make successful predictions about an individual's mother tongue merely by looking at his/her syntactic predispositions, word choices or pragmatic competence in the target language.

It is the pronunciation in the target language that gives the individual away about his/her mother tongue, because it is a well-established hypothesis (Lenneberg, 1967) which has been around for nearly 50 years that after a certain critical period it is almost impossible to perfectly acquire the sound system of a foreign language. There are also some recent studies claiming that even after this proposed critical period, individuals might attain full control over the pronunciation of the target language (Levis, 2005; Scovel, 2000); however, the results of such studies reflect the exceptions rather than the rules.

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Global pronunciation issues about the English Language

Coined by Selinker in 1972 (Ellis and Barkhuizen, 2005, p. 54), the concept of interlanguage has been used to refer to an in-between phase that nearly all second language learners go through. The learners, according to this concept, are close to the target language but not far away from their native one either, and most of the time this stage is regarded as a system on its own. Second language phonology is also a topic of discussion in this framework.

Oral production in English for non-native English speakers (NNES) has been a topic of discussion for a considerable amount of time, and various stands have been taken about the issue. For instance, since the times when contrastive analysis entered the scene (Lado, 1957), there have been supporters of the idea that the native speakers of English (NES) are ideal models for proper pronunciation, and the learners of English as a foreign language (EFL) should aim at attaining pronunciation skills like those of native speakers. With such a point of view, Eckman (1977) proposed an approach based on markedness. From this respect, marked aspects at any level of a given language will be more difficult to learn or acquire than unmarked ones, and as the degree of markedness go up so will the degree of difficulty. In the same era, error analysis of language learners also started to gain attention (see Corder, 1967), which was in conflict with the contrastive analysis approach because errors of language learners appeared to be a definite system of language at every point during development. Later in the course, it was also discussed that language teaching practitioners were emphasizing suprasegmental features rather than segmental in promoting intelligibility (Avery and Ehrlich, 1992). It might be argued that such foregrounding of suprasegmental features of spoken register may have led to a neglect of the analytical aspects of natural stream of speech.

In one of the groundbreaking works related to the topic Jenkins (2000), referring to the English language as lingua franca, brings the concept of intelligible pronunciation into the foreground. To her, only the core aspects of pronunciation should suffice for the learners of this lingua franca (ELF). Anything outside of this core should be regarded as details which ought to be dealt with later in the acquisition process. She even goes further and proposes to exclude some sounds like sounds /ð/ and /θ/, the weak forms of grammatical words, and pitch movement. It is also claimed that deviations from target forms in these areas will cause no communication problems and some of these features are even unteachable.

Recently, one of the main questions about the issue has been whether the need of a NNES being understood by a NES is greater than the need of a NNES being understood by another NNES. To put it another way, do non-natives try to communicate with other non-natives in English more than they do with native speakers of English? In an attempt to find answers to such problems, Murphy (2014) suggests that English language practitioners should not overemphasize native English speaker models while trying to deal with pronunciation but rather they should include some attention to non-native English speaker models as well.

Another global aspect of pronunciation issues is related to the markedness theory. Although markedness theory itself is not in direct relationship with the concerns of the current study, some insights stemming from this theory could be useful in a couple of ways. The concept of markedness actually dates back to the Prague School, in specific to Nikolai Trubetzkoy and Roman Jakobson (de Lacy, 2007). At its core lies the asymmetric relationship between elements of the same phonological classes. For example, among the set of consonant sounds /m/, /n/, /b/, /d/ the first two, /m/ and /n/, are in a contrast with the last two sounds of the set /b/ and /d/ in terms of nasality because the sounds /m/ and /n/ are nasalized consonants in nature whereas /b/ and /d/ cannot be categorized under this heading. Such dispositions add distinctive features to individual phonemes making them marked in contrast to the other phonemes in the same phonological class. When considered from this perspective, the dental fricatives /ð/ (eth) and its voiceless pair /θ/ (theta) are marked sounds. In addition, the velar-nasal sound /ŋ/ (engma) is also marked. These sounds, like the other marked ones, are problematic both in the first and second language acquisition or learning process.

There are other phonological dynamics acting in this process. For example, there are claims that phonemes have tendencies to attract or repulse each other. One of these claims, the theory of phonemic attraction and repulsion which was proposed by Hill (1936) actually attracted little attention at the time. According to this theory, phonemes in a given language do not act freely but rather on phonological principles of that language, which result in a frequency-based attraction or repulsion among phonemes. For example, the vowel /ɜ/ in English is always followed by the consonant /r/. This phenomenon also causes phonological change in the long run. For example, the pronunciation of the word often (/ˈɒf.ən/ or /ˈɒf.tən/) has been a matter of discussion since the 18th century, and the native speakers of English exhibit a clear inclination to pronounce it as /ˈɒf.ən/. In general, it is a very rare incident to witness phonological changes as they happen to occur over centuries, but in the case of often, a phonological change is being witnessed. This change could be attributed to phonemic attraction and/or repulsion theory as either the consonant /t/ is repulsed and/or the vowels /ɒ/ and /ə/ appear to be in a state of attraction.

A more recent account of such phonetic phenomenon

Table 1. Orthographic representations of the phoneme /ə/.

Orthographic representation	Example	Phonetic transcription(IPA)
a	*approach*	/əˈprəʊtʃ/
e	*travel*	/ˈtrævəl/
i	*incredible*	/ɪnˈkrɛdəbəl/
o	*police*	/pəˈliːs/
u	*suppress*	/səˈpres/
y	*sibyl*	/ˈsɪbəl/
certain letter combinations	*mountain*	/ˈmaʊntən/
unwritten vowel	*rhythm*	/ˈrɪðəm/

is explained within the framework of feature economy approach (Clements, 2003). In the related paper, two approaches which try to shed light on the underlying principles of the structure of sound systems are compared. The feature economy approach claims that speech sounds are organized with a principle which helps languages to maximize the combinatory possibilities of a few phonological features and to generate large numbers of speech sounds. The second approach, namely maximal dispersion, claims that speech sounds tend to be maximally dispersed in perceptual space. The results of this comparison led the researcher to the result that, compared to the dispersion model, the feature economy approach is well supported with universal data, and speech sounds show a tendency to concentrate along just a few feature dimensions in any language.

The perspectives that have been discussed so far are general in nature. However, there have been studies concerning very specific phonological issues like the schwa sound in the English language. Schwa is the most common sound in English. It is a weak, unstressed sound and it occurs in many words. It is often the sound in grammar words such as articles and prepositions. It is a well-established fact that one vowel from the language's inventory is consistently used by speakers of that language to break up ill-formed consonant clusters. In English, this vowel is typically schwa (Hume, 2011)

The term schwa is a Hebrew word in origin and it means 'emptiness' and Hebrew phonology possesses a vowel of the same quality (Skander and Burleigh, 2005, p.37), and this mid-central vowel phoneme is the most common vowel sound in English. It is claimed that 11 % of sounds uttered in an English conversation are schwas (Skander and Burleigh, 2005, p.37). It is a reduced vowel, which means that its acoustic qualities like pitch, stress and duration of articulation are altered making it a weak sound compared to the other sounds in the utterance. Depending on the dialect at hand, schwa may have the following orthographic representations (Table 1).

One can understand from the table that the unusual orthographic variety of schwa makes it very difficult for EFL learners to fix it to a certain orthographic form. That is to say, when an EFL learner tries to deal with the written form of words, the process is relatively easier if the sounds in the target word have fixed orthographic representations, which is the case with most of the English consonants. Therefore, different written representations of schwa are to be considered as one of the causes of pronunciation difficulties among EFL learners.

Pronunciation Issues in Turkish EFL Context

It is a fact that Turkish is a syllable-timed language whereas English is a stress-timed one. In syllable-timed languages, as is the case with Turkish, the more syllables you add to the utterance the more time it takes to utter it, and intonation and stress are not of major importance for communication. However, in the stress-timed languages like English, intonation and stress play an important role in the course of communication.

There are other phonological differences between Turkish and English which cause pronunciation problems among Turkish EFL learners. There appears to be more problems related to the vowels in English than there are with the consonants. The following figure displays the vowels in both languages.

In Figure 1, Turkish and English vowel inventories are displayed together for easier comparison. The Turkish inventory was taken from Zimmer and Orgun (1999, pp. 154–158), and the corresponding inventory was taken from Underhill (2005, p.10). It is obvious from the figure that, with 11 of them, the English language has more vowels than the Turkish language which appears to have eight vowels. This fact might be seen the main reason of the pronunciation problems that Turkish EFL learners go through. Within the framework of the current study, the schwa phoneme is of major importance, and its nonexistence in the Turkish vowel inventory should be noted aside. Generally speaking, schwa is similar to the vowel /ɨ/, a high central unrounded vowel which is common in Indo-European languages, or to /ɯ/, a high back unrounded which belongs to the Turkish vowel inventory. In fact, the closest sound to schwa in English is the /ɯ/ sound in Turkish. The only visible distinction between the schwa and the /ɯ/ sound in Turkish is the lip
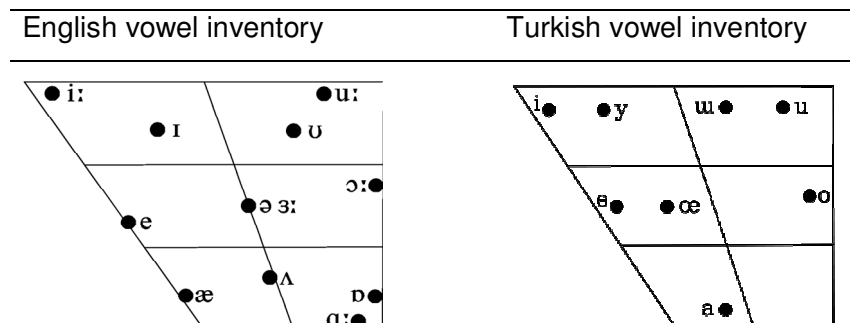
Figure 1. English and Turkish vowel inventories.

movement. In this respect, the schwa is neutral whereas the /ɯ/ is spread. One interesting point worth mentioning here is that, although not officially listed in any inventory, native Turkish speakers actually produce schwa during natural conversations as a sort of filler.

Another point worth mentioning at this point is that Turkish language has a peculiar front/back vowel harmony issue. According to this naturally occurring process, with some exceptions, if a certain word in Turkish contains front vowels like /i/, /y/, /e/, or /œ/, it cannot contain back vowels like /ɯ/, /u/, /a/ or /o/. In addition to front/back harmony, there is also another peculiarity in the Turkish vowel system which is called rounding harmony. According to this specific system, unrounded vowels (/i/, /e/, /ɯ/ and /a/) cannot come together in a word that contains the rounded vowels (/y/, /œ/, /u/ and /o/). These peculiarities of the Turkish vowel system might be among the many reasons for pronunciation problems that Turkish EFL learners go through.

There have been some important studies exploring pronunciation difficulties of Turkish EFL learners. In one of these studies, Demirezen (2007) claims that fossilized pronunciation errors for Turkish EFL learners are consonants like / t---θ, d---ð, v---w /, and vowels like / e---æ, e---ɛ, æ----ɛ, ə---æ, æ--Λ, ɔ----ow, ʊ ----- ʊw/. Demirezen (2010) also claims that since the schwa sound does not have a corresponding sound in the Turkish vowel inventory, its articulation is somehow compromised by Turkish EFL learners. The phonemic effects of this sound over grammatical categories are emphasized, and since it causes semantic changes, it sure has a potential of leading to communication breakdowns. He also dwells on the reasons for the mispronunciation of schwa by Turks and reaches to the conclusion that mother tongue interference, vowel reduction, connected speech, lack of professional instruction are some of the causes that lead to the mispronunciation of this phoneme by Turks.

In their studies, which was carried out with Turkish EFL learners, Geylanioğlu and Dikilitaş (2012) examined the pronunciation issues about the sounds schwa /ə/, etha

/ð/, theta /θ/ and engma /ŋ/. The subjects in this study were given isolated words which involve these sounds. The researchers found that the subjects have serious difficulties in pronouncing all of these sound. The study suggests that, in order to facilitate the pronunciation of these sounds, the students could be trained through conceptualization methodology, which helps learners to form an idea or principle about what is to be learnt.

In another related study Varol (2012) investigated the effects of the Turkish sound system on Turkish speakers' English pronunciation by making use of loanwords from Indo-European languages. The participants were asked to read 21 words in isolation and in sentences. After audio-recording, the data was evaluated in terms of approximation to native pronunciation through a 5-point scale. It was revealed that Turkish adult speakers had difficulty in pronunciation of phonemes such as θ, ð, ɹ, t and æ. because of the participants' native language. It was also observed that the participants tended to use sounds with the closest Turkish phonemes t, d, r, e as substitutes.

It is a fact, and quite natural, that Turkish EFL learners do go through problems in terms of pronunciation.

Among the prominent ones, we can see the schwa /ə/, the etha /ð/, the theta /θ/, the engma /ŋ/ and the phoneme /æ/. This phenomenon, in fact, is related to the effect of Turkish sound system over English pronunciation. For instance, although there are no remarks in the literature reporting pronunciation difficulties concerning the phonemes /r/ and /l/ in Turkish EFL contexts, particularly in the teaching of rhotic accent of English, the related literature abounds with research reports concerning problems with these sounds (Goto, 1971; Minematsu et el., 2002 for Japanese; Fachun and Pengpeng, 2009 for Chinese; Hallé et al., 1999 for French and Goldstein et al., 2005 for Spanish ESL and EFL contexts).

As is clear from the picture depicted, the related literature lacks studies concerning pronunciation issues of Turkish EFL teacher candidates. Therefore, taking into account the points made thus far, this study aims at answering the following research questions:

1) What are the phonemes in the English language that Turkish EFL pre-service teachers commonly mis-pronounce?
2) What are the main reasons for these pronunciation problems?

METHOD

Research design

Since the current study is learner-centered, teacher directed, collaborative, context specific and relevant to the participants and their contexts, its research paradigm fits to what is generally referred to as classroom research (Angelo and Cross, 1993). To begin with, in-class observations of Turkish EFL pre-service teachers at a state university formed the basis of this study. In numerous classes, Turkish EFL learners were observed while trying to articulate utterances in English.

Mostly because of individual differences, there were many problems related to many different theoretical issues. However, there appeared to be commonalities concerning pronunciation problems among the teacher candidates. The main concern of this study is to dwell on these commonalities and determine related patterns, if there are any.

Participants

This study was carried out during the fall of 2012 academic year. 22 pre-service language teachers participated in the current study. Most of the participants were freshman students who had completed an intense English preparatory program which aims at C1 to C2 levels of proficiency in English.

However, in order to get a clearer picture, their proficiency levels were also tested through a multiple choice diagnostic test (Allen, 1990), and the test results revealed that the participants were actually at B2 (intermediate) level of proficiency on average.

Classroom procedures

In the first week of the treatment, students were trained about the IPA symbols and the articulation of the sounds by giving specific examples. In the following week, having learned how to read IPA symbols, some dictionary studies were carried out. In the third week of the study, pronunciation practices, with specific attention to problematic sounds of English, were done. After training about English phonology, the participants were asked to prepare presentations in English, and the topics of the presentations were left to their own choices. The topics were of interest to the participants, such as interesting facts or information about educational or cultural aspects. Once the topics were determined by the learners and checked by the researcher, the presentations started.

During these presentations, the presenters were videotaped via a high-definition camera recorder. The learners' pronunciation errors/mistakes were also noted down by the researcher. All of the presentations lasted 20 min on average. After the recordings were completed, they were handed out to the learners and the learners were asked to watch their own presentations and make a list of the words that they thought they mispronounced. During this process, the participants were told to ignore the intonation and stress patterns of the mispronounced words. While doing so, they were advised to use an online digital dictionary with pronunciation support. In our case it was the Cambridge online dictionary which is

Table 2. Frequency of mispronounced sounds by the participants.

Problems	n	%
ə	54	39.42
Diphthongs	21	15.32
æ	15	10.95
w	11	8.03
r	9	6.57
ŋ	6	4.38
θ	4	2.92
Others	17	12.41
Total	**137**	**100**

freely available at http://dictionary.cambridge.org/. This assignment functioned as a double-check for the mispronounced words on the learners' side.

After all the presentations were completed, a list of mispronounced words was made collectively. That is, each student compared his/her own list with other learners. The aim of this activity was to foreground the common and salient mispronounced items among the learners. While composing the list, only the most notable mispronounced words were recorded. The list which was formed by the researcher was also compared with the ones made by the learners. As a result, a list of 120 items which was checked both by the researcher and the learners themselves was compiled.

This list was turned into a table in order to find out the most prominent features of the mispronounced words and the patterns to emerge. These commonalities and patterns were then shared with the participants with an aim to raise awareness of the nature of their own oral production.

Limitations of the study

As this study is a classroom research in nature, the results are highly context-specific and limited to the environment in which it was carried out. However, it shouldn't mean that these results cannot be integrated into the related literature at certain points.

FINDINGS

In this section, the results gleaned from the analysis of the mispronounced words will be discussed. Commonalities and patterns among these words will be highlighted and, by taking into account the phonemic attraction/repulsion theory which has been mentioned previously, the relationships between the mispronounced phonemes will be presented.

A large variety of words were observed to be mispronounced during the presentations; however, the list which was constructed in collaboration with the participants does not reflect all the pronunciation errors/ mistakes surfaced during the presentations. Only the most noticeable and salient ones were recorded and brought forward. Table 2 contains the common problematic sounds determined during the presentations.

The first and maybe the most important result of the

Table 3. Mispronounced words that contain the phoneme /e/.

Word	Pronunciation (Learner)	Pronunciation (US)
About	/ebaʊt/	/əbaʊt/
America	/ʌmerikʌ/	/əmerikə/
Approach	/eprotʃ/	/eprəʊtʃ/
Approve	/epruːv/	/əpruːv/
Area	/area/	/eriə/
Award	/evard/	/əwɔːd/
Biography	/bɪogrʌfi/	/baɪɒgrəfi/
Character	/kʌrekter/	/kerɪktər/
Develop	/develop/	/dɪveləp/
Dictator	/dɪktʌtœr/	/dɪkteɪtə/
Foreign	/foreɪn/	/fɒrən/
Fortunate	/fortʃuneɪt/	/fɔːtʃənət/
hypothesis	/hɪpotesɪs/	/haɪpɒθəsɪs/
Illegal	/ɪllegʌl/	/ɪliːgəl/
Major	/medʒor/	/meɪdʒə/
Mosquito	/moskito/	/məskiːtəʊ/
Mystery	/mʌjstrɪ/	/mɪstəri/
Percent	/pœrsent/	/pəsent
Probably	/probʌbli/	/prɒbəbli/
Society	/sosaɪəti/	/səsaɪəti/
Success	/sʌkses/	/səkses/
technology	/teknolodʒi/	/teknɒlədʒi/
Ultimate	/ultɪmeɪt/	/ʌltimət/
Vietnamese	/vɪetnʌmiːz/	/viːətnəmiːz/
Visible	/vɪjzəbəl/	/vɪzəbəl/

current study is that among the 120 items in the list, detailed in the methodology section, 54 words (nearly 40 %) contain the phoneme schwa /ə/. In other words, this sound is the most commonly mispronounced phoneme among others. However, in some situations the participants were able to articulate this sound or the Turkish equivalent /ɯ/ sound. The situations that are concerned with the articualtion of this sound by Turkish EFL learners are analysed in the following three tables. In order to demonstrate the patterns that occurred, these mispronounced words were divided into three groups. In the first group of words, the /ə/ phoneme is itself mispronounced. In the second group of words, the participants are able to produce this sound or an approximation to it, yet the word is still mispronounced. In the last group of words, this sound occurs together with the /æ/ phoneme, and in all such instances the related word is mispronounced without any approximations. To begin with, in Table 3 some of the mispronounced words that include schwa are exhibited.

In the table, the first part of the words that contain the sound schwa are shown. This group includes the mispronounced words with schwa in them, but there seems to be no particular pattern among these words. The effect of Turkish (the participants' mother tongue)

seems to be playing an important role here. Since in Turkish there is a sort regularity in terms of orthography and pronunciation, and since most Turkish EFL learners first encounter with words in English in their written forms, they tend to pronounce these words as they are represented on paper. However, even this tendency is not consistent with the underlying rationale. For example, one of the mispronounced words in the list, America, is pronounced as /ʌmerikʌ/ by two the participants while it should be pronounced as /əmerikə/. The problem is while all the sounds in this word are pronounced in accordance with Turkish pronunciation conventions, the letter c in this word, which represents the phoneme /dʒ/ in Turkish, is pronounced as /k/ as in the English language. It is very likely that some conventions of English pronunciation are learned or maybe acquired by these learners, but some others seem to be missing from learners' repertoires thus creating a situation which is in line with the concept of interlanguage. In fact, almost all the other words in the list above like *illegal, foreign, probably* or *ultimate* share this common inconsistency. In addition to this, being not aware of the orthographic variety of schwa, the learners are producing this sound in line with this variety. Therefore, what can be interpreted form Table 3 is that both the first language of the participants and the

Table 4. Mispronounced words that contain /ə/ or /ɯ/.

Word	Pronunciation (Learner)	Pronunciation (US)
achievement	/etʃivmɯnt/	/ətʃivmənt/
ancient	/enʃɯnt/	/eɪnʃənt/
appreciation	/epreʃieʃɯn/	/əpriːʃieɪʃən/
author	/oːtɯr/	/ɔːθə/
business	/bjzɯnɯs/	/bɪznəs/
career	/kerɪur/	/kərɪər/
circle	/sœrkɯl /	/sɜːkəl/
confident	/konfɪdɯnt/	/kɒnfɪdənt/
durable	/dureɪbɯl/	/djʊərəbl/
entertainment	/enterteɪnmɯn/	/entəteɪnmənt/
experience	/eksperɪuns/	/ɪkspɪərɪəns/
higher	/hajɯr/	/haɪə/
honor	/honɯr/	/ɑːnə/
kingdom	/kɪnkdɯm/	/kɪŋdəm/
pioneer	/pajnɪur/	/paɪənɪər/
popular	/populur/	/pɒpjʊlə/
pronunciation	/pronaʊnsieɪʃun/	/prənʌnsieɪʃən/
revolution	/rɪvoluːʃun/	/revəluːʃən/
signal	/saɪgnɯl/	/sɪgnəl/
water	/votɯr/	/wɔːtər/

orthographic variety of the sound schwa appear to be the main reasons for the pronunciation problems that Turkish EFL learners go through with the words listed in the table.

The participants in the current study were not always unable to produce schwa. In some situations, as represented in Table 4, they were somehow able to produce this sound or an approximation for it. What is meant by approximation in this context is the substitution of a problematic sound in the target language with a close sounding one in the first language phoneme inventory. The following table summarizes these instances.

In Table 4, another group of mispronounced words that contain schwa is listed. In the list, since it is virtually impossible to determine the exact lip movements of the participants, the phoneme represented with /ɯ/ could also be an approximation for schwa as well. The problems with the words in the list are not related to schwa itself but possibly to other phonological issues. What is noteworthy in the table is that approximation to schwa (or schwa itself) occurs at the end syllables in all of the words listed in the table. In other words, the participants are able to produce this sound (or a close one) when it occurs at the end of a word. In no other situation were the participants able to produce this sound or another sound close to it.

It could be discussed that these pronunciation problems are occurring because of the vowel harmony issues in Turkish which were mentioned previously. Although there are clear and natural tendencies concerning the vowels in

the Turkish language, the vowel harmony system do not seem to apply here. When words like *ancient, circle, distance* and *experience* (and many others) in Table 4 are analyzed from this perspective, Turkish EFL learners are actually producing utterances which are not acceptable in Turkish pronunciation system. In the utterances listed in this table, the participants bring together the front Turkish vowels (/i/, /y/, /e/, /œ/ and /a/ with the back ones (/ɯ/, /u/ and /o/). The words mentioned earlier are pronounced respectively as follows: /enʃɯnt/, /sœrkɯl /, /dɪstɯns/ and /eksperɪuns/, and it is quite obvious that, although they are not pronounced appropriately, they are not acceptable in Turkish pronunciaton system either. This, again, seems to be a characteristic of interlanguage. The participants in the current study are in a kind of interim phase in terms of phonology which resembles both to English and Turkish, yet isn't quite acceptable for neither.

The last finding of the current study to be discussed is related to an interaction of two English phonemes, schwa and the /æ/ sound. In the third group of the words which were mispronounced by the participants, these two sounds occur together as listed in the Table 5.

In Table 5, a group of mispronounced words are listed together because there appears to be a common pattern in all them. All the words listed in the related table include the phonemes /æ/ and /ə/. It appears that when these two sounds come together in a certain word, the participants cannot pronounce this word properly, and it is not an either-or situation; they mispronounce both of

Table 5. Mispronounced words that contain /ə/ and /æ/ at the same time.

Word	Pronunciation (Learner)	Pronunciation (US)
accurate	/ekjreɪt/	/ækjərət/
advocate	/edvokeɪt/	/ædvəkeɪt/
analysis	/enʌlisis/	/ənæləsɪs/
answer	/ensvʊr/	/ænsə/
bachelor	/betʃelor/	/bætʃələr/
category	/kʌtegori	/kætəgri/
factor	/fʌktœr/	/fæktə/
program	/progrʌm/	/prəʊgræm/
salary	/sʌlʌri/	/sæləri/

the sounds. In the list that includes common mispronounced words, there are 15 mispronounced words with the sound /æ/ (see Table 2), and nine of them also include /ə/ as exhibited in Table 5. This situation might suggest a kind of phonemic attraction between these two sounds which has a potential to create pronunciation problems for certain EFL learner groups. The other vowels besides schwa do not tend to display such a pattern, at least with the words recorded in the current study.

DISCUSSION AND CONCLUSION

In conclusion, for Turkish EFL learners, at least for the group that participated in the current study, schwa is the most commonly mispronounced phoneme among others mostly because of its orthographic variety. The participants also have trouble pronouncing the phonemes /θ/, /ŋ/ and /æ/. In addition to this, finding of the current study is that, there appears to be a potential problem for Turkish EFL learners with the words where the sounds /æ/ and /ə/ couple, which is very likely to stem from a phonemic attraction between these two sounds. That is to say, phonemic and phonetic dynamics of the Turkish language seem to operate in different ways than those of the English language, at least for the sound schwa. It is interesting that the same potential problem was reported in a recent study carried out by Gan (2012). Moreover, if /ə/ is in the final position, Turkish EFL learners are able to produce the sound, or an approximation for it. However, if it is in the initial position, they are unable to produce it most of the time. L1 influence is obvious in these problematic sounds, however, in certain situations Turkish vowel harmony, while the participants are speaking English, seem to be ignored.

The results confirm the findings of the related literature. In terms of methodology, it is like a tradition to make EFL learners read out isolated lexical items, record, and analyze the transcriptions (Demirezen, 2005, 2010; Geylanioğlu and Dikilitaş, 2012; Hismanoglu, 2009). In the current study, however, a different approach was taken by recording learners' utterances as they naturally occur. To put it in another way, the problematic sounds were not predetermined, but rather they were determined after general analyses.

Demirezen (2010) states that mother tongue interference could be counted for fossilized pronunciation problems for Turkish EFL learners by stating that there seems to be no corresponding sound for schwa in the Turkish vowel inventory. However, as he also acknowledges, the vowel /ɯ/ in Turkish is quite similar to /ə/ in terms of both manner and place of articulation. This similarity raises the question as to why Turkish EFL learners experience significant amount of problems in articulation of this sound. The researcher of the current study holds the idea that one of the parameters that cause such a fossilization phenomenon is the different attraction and/or repulsion dynamics between English and Turkish. This point becomes important because the lack of intelligible pronunciation of the sound schwa is more likely cause communication problems as it has its own dynamics in the natural stream of speech which affect not only segmental but also suprasegmental aspects of speech, like intonation and stress.

In practice, the finding concerning the relationship between the phonemes /ə/ and /æ/ is supposed to channelize Turkish EFL teachers into considering this relationship while trying to teach either of them. In other words, as with the case of collocations in vocabulary instruction, such relationships among phonemes should be foregrounded. It is obvious that Turkish EFL learners go through problems in transition from the tongue and lip position that is needed while producing /æ/ to the tongue and lip position needed for /ə/. These two phonemes should be instructed together in order to highlight their relationship. Otherwise, if they are taught separately, and even if they are produced properly by the learners, when these two phonemes couple in a certain word, they might not be able to make the necessary transition in the vocal tract and end up with mispronunciation or approximation of some kind. Furthermore, if EFL learners learn how to deal with the peculiar sound schwa, they might also improve their control over other phonemes.

The current study, although inherently a classroom research, could be regarded important as it fills a gap in the related literature concerning pronunciation problems of Turkish EFL teacher candidates. Unlike what has been accepted, sounds like /θ/ and /ð/ are very low in frequency and this is why their mispronunciation shouldn't pose communication breakdowns as the context of the conversations will help interlocutors to deduce the mispronounced words. From this perspective, in addition to a frequency-based approach to phonemes, the concept of intelligibility should also be promoted among English language practitioners. Furthermore, as the results of this study clearly show, the phonemic interactions among English phonemes, like the concept of collocations in lexicology, should also be taken into consideration to certain extents.

Recommendations for further studies

This study ignores stress and intonation problems of the participants. This point remains to be researched as there is a serious gap about this issue in the related literature. In addition to this, Turkish EFL learners' attitudes towards pronunciation problems might help us understand the underlying problems to an extent. In relation to this point, Turkish EFL teachers' ideas concerning the pronunciation problems of EFL learners could be investigated as it is very likely that they are spending too much time on low frequency sounds which are nearly impossible to teach (Jenkins, 2000).

Conflict of Interests

The author have not declared any conflicts of interest.

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Full Length Research Paper

Multidimensional computerized adaptive scholastic aptitude test program used for grade 9 students under different reviewing test conditions

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The aim of this research is to study the accurate prediction of comparing test information and evaluation result by multidimensional computerized adaptive scholastic aptitude test program used for grade 9 students under different reviewing test conditions. Grade 9 students of the Secondary Educational Service Area Office in the North- east of Thailand, in 2014 academic year were the sample used in this research. The research materials were two test programs: the test program that allows reviewing of answers and the one that does not allow reviewing of answers. The manual of the test program and evaluation form of the multidimensional computerized adaptive scholastic aptitude test program used for grade 9 students in different reviewing test conditions showed that: 1) The test program is an accurate predictor of the students' achievement, as verbal factor correlates with the students' achievement in five core subjects. The aptitude tests on number and reasoning correlate with the students' achievement in Mathematics, science and social science. The aptitude test on space correlates with the students' achievement in Mathematics and science. 2) The test program has statistical and significant difference at .05 level. 3) The evaluation result of the two test programs has statistical significance at .05 level.

Key words: Scholastic aptitude, multidimensional, computerized adaptive test program, test programs.

INTRODUCTION

The work studies grade 9 adolescent students, who have many problems to deal with. Most students choose to study what their friends study, regardless of their aptitude. This corresponds with many research works that have discovered that aptitude influences one's decision making on what to study in future. Pha-on (2010) studied the

factors that affected the exciting learning of grade 9 students under Primary Education Service Area Office in Saraburi. In the study, it was found out that the highest average was obtained by the students who chose to study based on their aptitude. As a result, education management must provide content and learning activities

that are in line with the aptitude and differences of the individuals in order to make the students perfect all way round, be able to find a job and live happily with other people. Each school must provide flexible learning process for students to choose according to their aptitude and interests (Ministry of Education, 2010). However, aptitude is an innate ability that cannot be directly realized, so testing theory is used as a tool to scale aptitude.

Scholastic aptitude test, mostly made and developed from Multi-Factor Theory by Thurstone, is used to measure students' academic ability. This results from the processing of knowledge and experience gained by students which in turn will enable them to have success in their choice field of study as well as success in their future occupation. Moreover, the test is also used in qualifying examinations, classifying students, diagnosing their capabilities, measuring the development of learners, predicting success, comparing intelligence, evaluating school-record and research. The research showed that scholastic aptitude correlated with students' academic achievement and the ability to predict scholastic achievements, which were mostly verbal, number, reasoning and space factors (Loard and Nicely, 1997; Morton, 2004). The test where students mostly write on answer sheet is called paper and pencil test or conventional test. It had several weak points, and so theorists developed and reformed it from conventional test to modern test theory.

Currently, computerized adaptive test is based on item response theory. Multidimensional computerized adaptive test is implemented in each dimension separately, and each dimension has a high relevance, that is, using multidimensional item response theory. Segall suggested that this theory should be used for selection of limited number for each content. This is consistent with the teaching of today, which focuses on integrating more knowledge. So, measurement is intended to change in part with a focus on measurements of performance that are more complex (Junpeng, 2007). Computerized adaptive test still has issues that need to be discussed. After the test is completed, the examinees should be given the opportunity to review answers. Vispoel (1998), Olea et al. (2000) Vispole et al. (2000) and Revuelta et al. (2003) found out that most examinees like to review answers in order to reduce anxiety. After reviewing the answers, the number of correct answers will increase; but researchers, like Wainer et al. (1993) and Green et al. (1984) have proposed it, stressing that opportunities should not be given for reviewing answers due to limited time of the test process. Previously in the country, there were only a few studies on unidimensional computerized adaptive test. One of such was that of Pimsiri (2006) who found that there was no difference between the examinees who had high level of ability and those with average ability under conditions of not reviewing and reviewing answers. But there was statistical significant

difference (.05 level) between examinees with medium and low level ability and examinees with average ability under the conditions of not reviewing and reviewing answers.

The researcher is interested in developing the multidimensional computerized adaptive scholastic aptitude test program under different reviewing test conditions, focusing on verbal, number, reasoning and space factors. In addition, this program will guide further study of both general and vocational education consistent with testing the ability of individual examinees. It will be used as information for further study and as a guide for students to realize their aptitude. It will also be useful for students who are going to graduate from grade 9 and as a method for developing multidimensional computerized adaptive test in details.

Research questions

1. How are the test program that allows reviewing of answers, and the one that does not allow reviewing of answers accurate predictors ?
2. Are they any differences between information of the test program that allows reviewing of answers and the one that does not allow reviewing of answers?
3. Do the examinees have different opinions about the test program that allows reviewing of answers and the one that does not allow reviewing of answers?

The purpose of the study

1. To study the accuracy of Multidimensional Computerized Adaptive Scholastic Aptitude Test Program to predict
2. To compare the test information of multidimensional computerized adaptive scholastic aptitude test program used for grade 9 students under different reviewing test conditions.
3. To compare the evaluation of multidimensional computerized adaptive scholastic aptitude test program used for grade 9 students under different review test conditions.

METHODOLOGY

Materials

The materials used include 1, multidimensional computerized adaptive scholastic aptitude test program for grade 9 students; it has 2 programs: program that allows reviewing of answers and program that does not allow reviewing of answers.
2. Manual of multidimensional computerized adaptive scholastic aptitude test program for grade 9 students under different reviewing test conditions.
3. Evaluation form of multidimensional computerized adaptive scholastic aptitude test program for grade 9 students under varying reviewing test conditions.
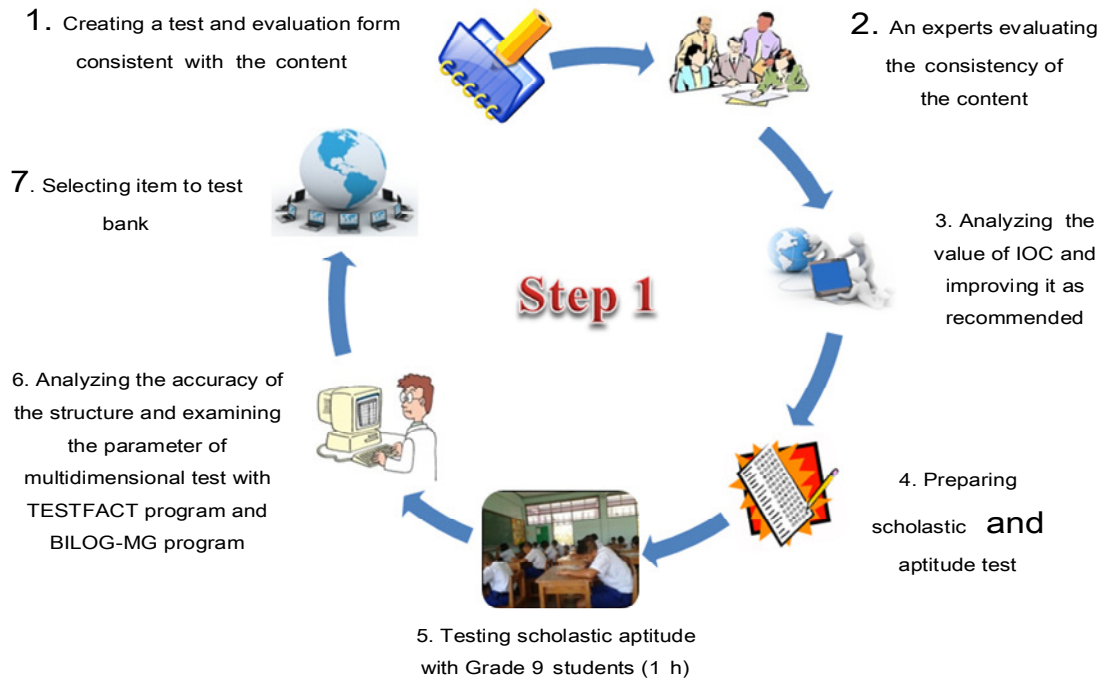
Figure 1. Developing the test bank of scholastic aptitude.

Development of materials used for data collection

Multidimensional computerized adaptive scholastic aptitude test program for grade 9 students: this program selects item based on the ability of each examinees; that is, each examinee is given different items. The examinee gets 1 score if the answer is right and 0 score if the answer is wrong. See the procedures below:

1. Program design includes structure and application component.
2. Building program flowchart includes input, process and output.
3. In selecting language for development test program, the researcher selected Visual Basic .Net 2010 and Microsoft SQL Server 2008.
4. Coding
5. Trial program was used to check authenticity primarily by the researcher.
6. Experts verify the quality of the test program.
7. The recommendation of experts was improved and a complete test program was developed.

Manual of multidimensional computerized adaptive scholastic aptitude test program for grade 9 students under different reviewing test condition: The procedures are as follows:

1. Manual of program design includes information about the program, objective and utilization of the program, preliminary agreement, installations, running of the program, and definitions of specific terms.
2. Preparing the manual of the program
3. Experts verify the quality of the manual
4. The recommendation of the experts was improved and the complete manual was developed.

Evaluation form of multidimensional computerized adaptive scholastic aptitude test program for grade 9 students under different reviewing test condition: The procedures are as follows:

1. Learning and synthesizing how to create evaluation form related documents.
2. Building evaluation form using psycho-social criteria given by Sympson; they consist of 4 aspects : 1) the statement and how to perform the exam, 2) Attraction of test program, 3) The anxiety in the test and 4) The general opinion about test using computer program
3. Experts verify the quality of evaluation form
4. The recommendation of the experts was improved and a complete evaluation form was developed.
Data collection is divided into 4 steps as follows:

Step 1: Developing the test bank of scholastic aptitude (Figure 1).

Step 2: Developing multidimensional computerized adaptive scholastic aptitude test program (Figure 2).

Step 3: Using the multidimensional computerized adaptive scholastic aptitude test program (Figure 3).

Step 4: Evaluating the multidimensional computerized adaptive scholastic aptitude test program (Figure 4).

Data analysis

To study the predictive accuracy of the test programme, Pearson Product moment correlation was used to analyze the relationship between the mean of the examinees' total ability from the test program and mean of the examinees' average ability from school record.

$$R_{xy} = \frac{N\sum XY - \sum X \sum Y}{\sqrt{\left[N\sum X^2 - (\sum X)^2\right]\left[N\sum Y^2 - (\sum Y)^2\right]}}$$

Figure 2. Development of multidimensional computerized adaptive scholastic aptitude test program.
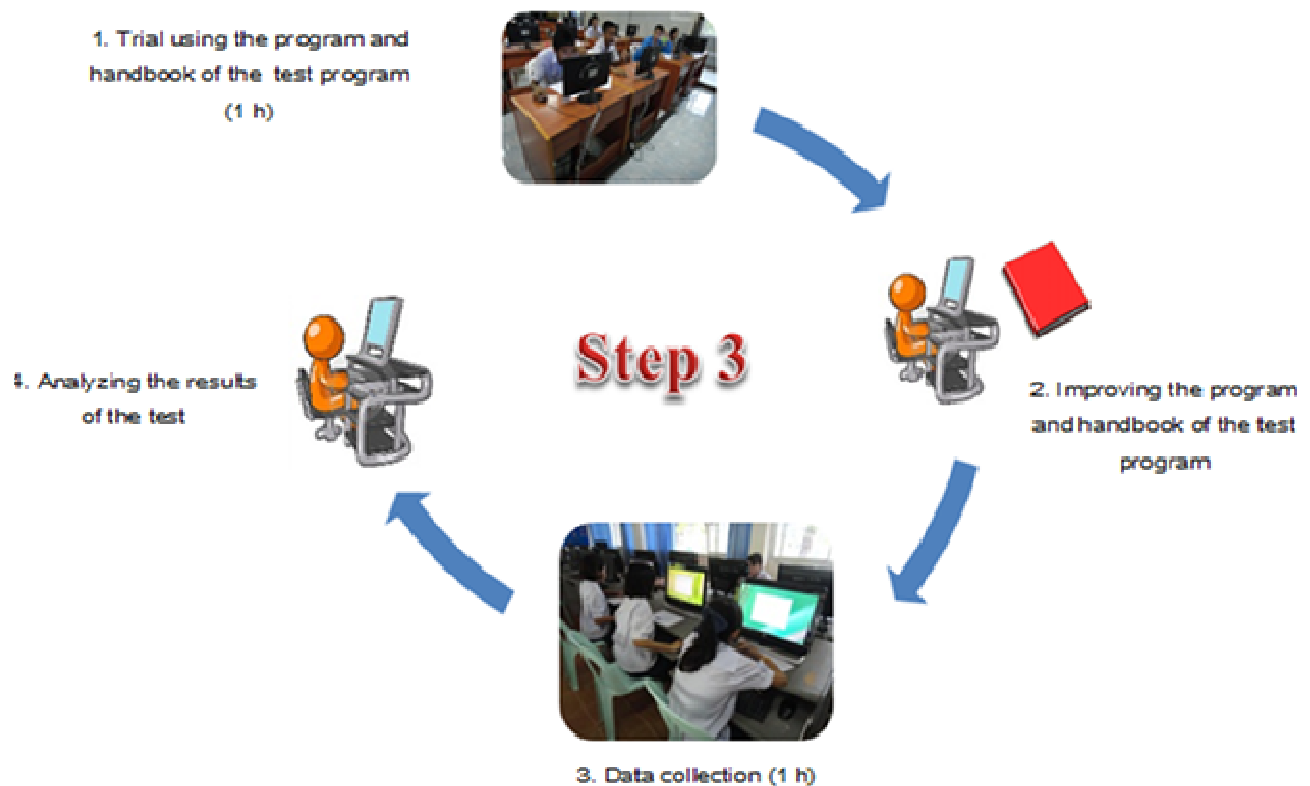
Figure 3. Using the multidimensional computerized adaptive scholastic aptitude test program.
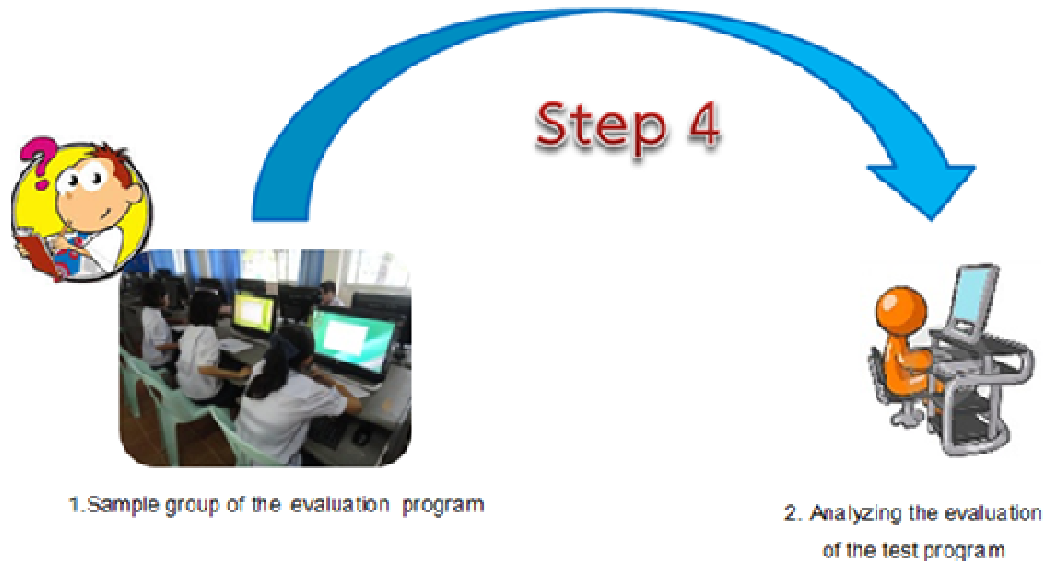
Figure 4. Evaluating the multidimensional computerized adaptive scholastic aptitude test program.

where R_{xy} is correlation coefficients between X and Y,

X = the examinees' total ability from test program

Y = the examinees' ability from average school record

$\sum XY$ = sum of product between X and Y

$\sum X$ = sum of each examinee's total ability from test program

$\sum X^2$ = sum of squares of each examinee's total ability from test program

$(\sum X)^2$ = sum of squares of each examinee's total ability from test program

$\sum Y$ = sum of each examinee's total ability from average school record

$\sum Y^2$ = sum of squares of each examinee's total ability from average school record

$(\sum Y)^2$ = sum of squares of each examinee's total ability from average school record

N = all of the examinees

Independent sample t-test was used to compare and analyze the test information; its formula is given below (Hambleton and Cook. 1977 : 66):

$$I(\theta) = \sum_{i=1}^{k} I_i(\theta) \quad , i = 1, 2, \ldots, k$$

$$I_i(\theta) = \frac{2.89a_i^2(1-c_i)}{\left[c_i + e^{1.7a_i(\theta-b_i)}\right]\left[1 + e^{-1.7a_i(\theta-b_i)}\right]^2}$$

where $I(\theta)$ is test information at ability θ

$I_i(\theta)$ = item information at ability θ

k = number of questions in the test

a_i = discrimination parameter of item i

b_i = difficulty parameter of item i

c_i = guessing parameter of item i

e = natural logarithm ($e = 2.72$)

One-way MANOVA was used to compare and evaluate the test program as follows.

Mean

$$\overline{X} = \frac{\sum X}{N}$$

where $\overline{X}$ is mean

$\sum X$ = sum of data

N = number of all data

Standard Deviation

$$S.D. = \sqrt{\frac{N\sum x^2 - (\sum x)^2}{N(N-1)}}$$

where $S.D.$ is standard deviation

x = each data

x^2 = squares of data

N = number of all the data

Table 1. Results of the correlation between mean of the examinees' total ability from test program with mean of the examinees' ability from average school record.

Academic achievement	Test program	Aptitude component				
		Verbal	Number	Reasoning	Space	Total
Thai	Allows reviewing of answer	.859**	.173	.058	.270	.796**
	Does not allow reviewing answers	.680*	.147	.148	.177	.399*
Mathematics	Allows reviewing of answers	.766*	.856**	.802*	.858*	.759*
	Does not allow reviewing of answers	.644*	.774*	.596*	.600*	.372*
Science	Allows reviewing of answers	.676*	.852*	.755*	.872*	.729*
	Does not allow reviewing of answers	.501*	.605*	.676*	.899*	.342*
Social	Allows reviewing of answers	.662*	.604*	.689*	.130	.618*
	Does not allow reviewing of answers	.420*	.430*	278**	.076	.300*
English	Allows reviewing of answers	.860*	.152	.155	.257	.599*
	Does not allow reviewing of answers	.362*	.098	.067	.080	.285*
Grade point average	Allows reviewing of answers	.732*	.855*	.835*	.848*	.757*
	Does not allow reviewing of answers	.733*	.679*	.775*	.658*	.608*

* statistical significance at .05 level; ** statistical significance at .01 level

Table 2. The comparison result of information test form of multidimensional computerized adaptive scholastic aptitude testing program under varying review test conditions.

Program	N	$\overline{X}$	S.D.	t	Sig.
Allows reviewing of answers	79	637.82	199.72	4.685*	.000
Does not allow reviewing of answers	79	511.35	132.98		

* statistical significance at .05 level

RESULTS

Results on the predictive accuracy of multidimensional computerized adaptive scholastic aptitude test program for grade 9 students under different reviewing test conditions showed that the test program was accurate in predicting the students' achievement (Table 1). Verbal factor was related with the students' achievement in 5 core subjects. Number factor and reasoning factor had relation with the students' achievement in Mathematics, Science and Social Science but had no relation with the students' achievement in Thai and English.

Space factor was connected to the students' achievement in Mathematics and Science but had no relation with the students' achievement in Thai, Social and English subjects.

The results of comparison in test information form from multidimensional computerized adaptive scholastic aptitude test program for grade 9 students under different reviewing test conditions: The researcher did a random sampling of the two research programs, which have the same amount. The result showed that multidimensional computerized adaptive scholastic aptitude test program for grade 9 students under different reviewing test conditions had different test information form with statistical significance at .05 level. The test program that allows reviewing test condition has average test information higher than the test program that does not allow reviewing test condition (Table 2).

Results of comparing evaluation of multidimensional computerized adaptive scholastic aptitude test program for grade 9 students under different review conditions: the result of the two programs was statistically significant at .05 level. When analyzing the issue of evaluation in 4 parts, the result of explanation and test operation in terms of general opinion about using computer program for test was statistically significant at .05 level. In three sections, the test program that allows reviewing of answers has high average greater than the test program that does not allow reviewing of answers. For assurance of the test program, there is no difference in the evaluation as shown in Tables 3-4.

Table 3. The results using one-way MANOVA for comparison of evaluation of the test program

Statistic	Value	F	Hypothesis df	Error df	Sig.
Pillai's Trace	.157	7.10*	4.00	153.00	.000
Wilks' Lambda	.843	7.10*	4.00	153.00	.000
Hotelling's Trace	.186	7.10*	4.00	153.00	.000
Roy's Largest Root	.186	7.10*	4.00	153.00	.000

*statistical significance at .05 level

Table 4. The results of using one-way MANOVA to make comparison in evaluation test program.

Issues of evaluation	Test program	N	$\overline{X}$	S.D.	F	Sig.
The statement and how to perform the exam	Allows reviewing of answers	79	4.27	.56	16.198*	.000
	Do not allow reviewing of answers	79	3.94	.64		
Attraction of test program	Allows reviewing of answers	79	4.20	.61	14.514*	.000
	Do not allow reviewing of answers	79	3.86	.71		
Anxiety in the test	Allows reviewing of answers	79	2.79	.83	.722	.397
	Do not allow reviewing of answers	79	3.13	.83		
The general opinion about testing by computer program	Allows reviewing of answers	79	4.09	.57	22.746*	.000
	Do not allow reviewing of answers	79	3.65	.67		
Overall	Allows reviewing of answers	79	3.95	.42	24.429*	.000
	Do not allow reviewing of answers	79	3.64	.46		

* Statistical significance at .05 level

DISCUSSION

The test program was an accurate predictor of the students' achievement. The computerized adaptive scholastic aptitude test was appropriate for testing the examinees' ability. So, this result is consistent with the reality that verbal factor affects learning of general communication, understanding the meaning of conversation, listening to explanation and reading of the main idea for comprehension of each subject. Chinese aptitude is related with 5 core subjects, while quantity aptitude is related to number, calculation and reasoning factors, which are the basic characteristics necessary for the students. Therefore, these two aptitude factors correlate with Mathematics, Science and Social Science. Space factor is the basic factor that affects imagination and vision, which are connected to Mathematics and Science. Moreover, the sample in this research had moderate to high ability and cooperated in the test as well. So, item response showed a careful reflection. The result of this study is in line with the study of Philatun and On-uma (2008: 77) who found that the good predictor of students' Mathematics achievement involved the students' aptitude such as number, space, reasoning and verbal factors.

Multidimensional computerized adaptive scholastic aptitude test program for Grade 9 students under different reviewing test conditions has different test information, which is statistically significant at .05 level. The computerized adaptive scholastic aptitude test program that allows reviewing of answers made the mean ability of the examinees higher than test program that does not allow reviewing of answers. In calculating the information test, the mean ability of the examinees were calculated. The test program that allows reviewing of answers and the test program that does not allow reviewing of answers had different information. This is connected to the study of Tienoraset (2006) that compared the average examinees' mean ability under the condition of not allowing reviewing of answers and allowing reviewing of answers. The examinees with medium and low ability and those with average ability under the condition of not allowing reviewing of answers and allowing reviewing of answers had statistical and significant difference at .05 level. However, there was no difference between the examinees with high ability and those with average ability in the condition of not allowing reviewing of answers and allowing reviewing of answers. From the study of Vispoel et al. (2000) on computerized

adaptive testing which allows reviewing of answers, it is found that the mean ability of the examinees slightly increased after reviewing of answers. Therefore, in this research , the examinees from allowing reviewing of answers test program had higher mean than the program that does not allow reviewing of answers; so, allowing of reviewing of answers test program has higher information test mean than the test program that does not allow reviewing of answers.

The result of the two evaluation programs is statistically significant at .05 level. The test program that allows reviewing of answers is greater than the test program that does not allow reviewing of answers. The examinees may likely want to review answers in order to be confident in the test; so, the opinions about the test program that allows reviewing of answers and the one that does not allow reviewing of answers differ. The research sample tested with the program that allows reviewing of answers has more satisfaction than the ones tested with the test program that does not allow reviewing of answers. However, for test program, it is necessary to use interesting and fashionable program as well as computer, which is not related to reviewing or not reviewing of answers. Therefore, in the research result, there is no difference between these two programs with the use of computer. Vispoel (1998) found that mostly of the examinees need to review answers and insisted that the examinees had positive opinion and satisfaction towards the test program that allow reviewing of answers more than the one that does not allow reviewing of answers.

Conflict of Interests

The authors have not declared any conflicts of interest.

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Full Length Research Paper

Developing public mind curriculum for lower secondary school classes using contemplative education methods

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The purposes of this study were to develop a public mind curriculum with Contemplative Education and to study the effect of using the curriculum to enhance public minds. The study was carried out using the research and development process, consisting of three phases: investigating fundamental data, developing a curriculum, and evaluating the results after using the developed curriculum. The sample group was made up of 26 students studying in Grade 8. The statistics used in the data analysis were percentage, mean, standard deviation, and one-way repeated measure ANOVA. The results of this research found that: 1) the developed curriculum is composed of four components, namely i) purpose, ii) learning content, iii) learning management, and iv) measurement and evaluation. The learning management of the developed curriculum was based on contemplative education, consisting of five processes and three steps and 2) the findings after using the curriculum were that students who studied using the developed curriculum had higher public mind towards family, school, and society from measuring four times at the .05 level of significance. Additionally, students were satisfied with the developed curriculum and learning management at a high level.

Key words: Contemplative education, public minds, public minds curriculum, public minds behavior.

INTRODUCTION

The concept of public minds refers to the pattern of meanings and the system of feelings, desires and aspirations established in the codes, rules and symbols embedded in the objective structures of social, economic, historical and political life. Subjectively, it is the set of assumptions, convictions, beliefs and values that ground the shared sense of social existence of the multitudinous groups that constitute a given social order (Lichtman, 2013). A further explanation can be incorporated from the Kohlberg's stage theory of moral development. Kohlberg positions three periods of development in the moral domain: the preconventional, conventional and the

postconventional. Each of Kohlberg's three periods is subdivided into two stages comprises of six stages of moral development. The Preconventional period (Moral Stages 1 and 2) begins in early childhood and extends through elementary school. The conventional period (Moral Stages 3 and 4) begins at the onset of post – elementary education and extends across the life-span of all but a small portion of the population. The post-conventional period (Moral Stages 5 and 6) begins sometime after adolescence. However, Colby and Kohlberg (1987) observed that postconventional thinking and action appear fully after early adulthood. The

conventional stage is characterized by maintaining the expectations of the individual's family, group, or nation and it is perceived as valuable in its own right, regardless of immediate consequences. The attitude is of conformity to personal expectations and social order, and also of loyalty to maintaining, supporting and justifying order. The contemplative curriculum is deeply embedded in the conventional period of Kohlberg's theory in that the learning activities are focused on the development of the students' public mind. That is a problem faced by the Thai students in the lower secondary school who do not have enough learning skills on public mind to support themselves (Kohlberg, 1973). Moreover, due to the serious socioeconomic problems that have plagued the country in recent times, the relevance of the contemplative curriculum was inevitable. There was an urgent need for students in the lower secondary education level to be equipped with the contemplative curriculum to create more awareness and preparedness for the changing society.

Contemplative Education must include the study of the students' perceptions in order to enhance and develop conscious awareness. Developing students progress by means of various techniques. These techniques being, based on individual aptitude, and emphasize on students creativity and free expression.

As the public mind curriculum unrest of the 1960s called both government and businesses to a higher level of accountability, their communication functions responded with the creation of more open, ethical, and socially responsible forms of public mind relations. The function of issues management (Chase, 1977) began to advise executives on ethically responsible policy decisions, and symmetrical public mind relations (Grunig and Hunt, 1984) began to incorporate the desires of the public for more fair and balanced decision making the 3-s' self-public mind for family, school, and social public to students' behaviors, and students and teachers' satisfactions were investigated. Although researches (Bivins, 1989; Pratt and Rentner, 1989) showed that scant attention was given to ethics in major public relations textbooks before this time, the last decade has shown an improvement. This interesting design to the civil-mindedness curriculum frameworks in teaching and discussing public mind relations student's her/himself; family, parent, and school to ethics are good news, especially for new practitioners so that they do not inadvertently limit their prospects for promotion. As newer data (discussed below) reveals, this promotion's research options may be constrained for practitioners who do not know public mind or feel prepared to advice on ethical dilemmas.

In 'the Investigation of Asking Public Mind', Barton (2015) pointed out the deficiency of simply asking students 'public mind' they did something, and developed the idea of accounting models to guide a much more extensive series of questions about reasons for action. A similar problem arises when students are asked 'public mind' about social phenomena like unemployment, poverty, inflation, or social community riots. A review of research asking students for their explanations of social problems shows that open-ended responses are rarely probed to elicit the whole 'the public mind curriculum framework model' which the respondent has in mind; that students' perceptions from research instrument questions tend to offer limited choices, and not to explore the possibility of 'enhancing behaviors' to develop students' achieving effects; and that there is a tendency to classify answers into their satisfactions toward their class of dichotomies rather than explore the public's ideas about specific public mind for social problems. Particular problems arise in studying élite belief systems since these are likely to be more elaborate than the public's. Content analysis of student's group discussions and media offer one avenue for studying this group.

The development of secondary students' public mind is too necessary and important because one of the factors of student or learner resources for national development to be prosperous in aspect, it is indispensable to develop students' needs and fundamental data for supporting a new curriculum to develop and enhance learning and teaching processes with the cooperative education and Contemplative Educational teaching plans whereas potentiality in aligned with inculcation of virtue and morality for students of the local secondary school country would then be of good quality and ethics, the basis from process of efficient socialization through social institutions including the family institute, educational institute, or religious institute. The development of public mind Curriculum Frameworks can be performed in concrete as well as sustainable form. With community participation in decision making as well as development, the community would feel that they are owners, and there is a partnership. This technique would be the way leading to sustainable development. Participation of all parties involved in the development of the public mind of the secondary learner or student. This study approach has not yet seen much emphasis improvement and development of secondary students to need for having the 3-public minds to change of their behaviors of their learning achievements on Thai's educational system.

The research purposes

1. To investigate fundamental data in developing a curriculum to enhance public mind based on contemplative education.
2. To develop a curriculum which enhances public mind for lower secondary school students based on contemplative education.
3. To evaluate the results after using the developed

curriculum.

METHODOLOGY

Participants

The samples were twenty six (26) students studying in a secondary educational class at Grade level 8 in Srinagarindra, the Princess Mother School Roi-Et, patronage of Her Royal Highness Maha Chakri Sirindhorn School, which is a public secondary school. The twenty six students were 14 years old, both girls and boys (53.84 and 46.15 percent respectively). Twenty-six students were assigned into the experimental group. They were selected by cluster random sampling technique. The families of the twenty six students were mostly from the middle class.

Procedure

The research was conducted through a methodology and development process, divided into 3 phases as follows:

Phase 1: the demographic data were studied including 2 steps as follows:

Step 1, the Contextual Study was administered by surveying the problem with 200 people composed of 111 males, 89 females and stakeholders (parents 70, school committee 15, local authorities 15, school administrative staff 4, teachers 16, students 80). The academic credentials of 122 were undergraduates, bachelor degree holders were 48, post bachelor degree holders 30. The results from the sampled number brought about the need for student development in the educational management.
Step 2, the rationale as well as theoretical approach and related research literature were studied including the Thai Basic Education Curriculum, Public Mind, Contemplative Education, and curriculum development in order to determine the objective and conceptual framework in the Curriculum Development.

Phase 2: the Curriculum Development including 2 steps are as follows:

Step 1, the Curriculum was outlined based on objective and conceptual framework in curriculum development. The curriculum document, the instrument for measurement and evaluation as well as data collection were established and evaluated by the experts and are as follows: α coefficient by Cronbach reliability 0.852, discrimination above 0.20 was deduced from 30 items. They were improved and revised according to recommendations before trying it out.
Step 2, the Curriculum Development was to improve the curriculum which was validated and improved its quality, and tried out in order to study the feasibility of the curriculum. Results were obtained from various sources such as classroom records, summary from observation forms, summary from the student's dairy, evaluation on the contemplative performance of the students, summary opinion from the researcher's evaluation while implementing the curriculum. The curriculum was improved thereafter.

Phase 3: the curriculum used was studied. It was to study the curriculum which was improved and revised for implementation with samples in order to study the curriculum use in real situation by evaluating the students' Public Mind Behavior towards family, school, and society as well as to study the students' satisfaction on

curriculum and learning management by implementation according to the following steps:

The Learning Management Plan was established with the participants. The activities for society and public utility or IS3 based on school curriculum of universal standard were performed for 1 semester, 18 weeks, 1 h each week, total of 18 h. One Shot Repeated measures experimental design was administered as follows:

$R_{ex} = O_1\ X_1\ O_2\ X_2\ O_3\ X_3\ O_4$
R_{ex} referred to the samples were randomly assigned into the experimental group.
O_1 referred to the Public Mind was evaluated before learning.
X_1 referred to the Learning Management based on curriculum, was performed during week 1-6.
O_2 referred to the Public Mind was evaluated during week 6.
X_2 referred to the Learning Management based on curriculum, was performed during week 7-12.
O_3 referred to the Public Mind was evaluated during week 12.
X_3 referred to the Learning Management based on curriculum, was performed during week 13-18.
O_4 referred to the Public Mind was evaluated after learning.
   The background of curriculum, objective, learning process, and measurement and evaluation were performed with the participants. The students' public mind behavior towards their family, school, and society, was evaluated before learning in curriculum. The learning was provided during the hour of activities for society and public utility or IS3 based on school curriculum of universal standard, were performed for 1 semester, 18 weeks, 1 h each week as follows:
   During learning in every hour, the researcher developed students' awareness periodically by inculcating the approach of public minds, and association of public minds and different things based on Contemplative Education. Because according to the study, it was found that the continuously repetitive telling or action would make the students think about public mind behavior normally. In addition, the students recorded their opinion in their diary (Table 1).
   The researcher recorded the findings of the learning management as well as classroom climate, and observed the students activity participation. The researcher observed the students' public mind in classroom during learning management, and recorded in the students' Public Mind Behavioral Observation. After the learning management in Week 6, 12, and 18, the students responded to the students Public Mind Evaluation Form during Session 2, 3, and 4. Then, the students were evaluated by their classmates. Later on, they were evaluated by teachers and parents outside their classroom. The students' classmates, teachers, and parents had to be the same person who evaluated before learning in the program.
During learning in Week 18, the students reflected their opinion from participation in public mind activity for society, and from learning in program for developing the lower secondary school students' public mind based on Contemplative Education, from all of 3 learning units. At the end of the learning, the students presented their opinions on public mind thinking and behavior through oral presentation by exchanging opinions within themselves. The students observed that the classroom activities were very interesting, yet they think that some of the principles taught in class were unrealistic in their daily lives. They equally observed that learning from the contemplative process built up a more independent approach in thinking, making decisions and exchanging ideas with their peer groups other than the traditional curriculum whereby they listen and answer questions to test their understanding on the subject matter. Furthermore, they found out that, they could better integrate their knowledge from their classroom to their communities.
   Data were analyzed from the Public Mind Behavioral Observation

Table 1. The learning unit and learning management based on contemplative education.

Learning Unit	Hour	Learning substance/activity	Learning Management based on contemplative education
1. Public mind for family	1	Inculcation	There were 3 steps in each hour of learning management as follows:
	2	Human's Value	
	3	Wrong Thought	
	4	My Family	
	5	Life Goal	Preparation Step: Awareness Creation, Openness and Readiness for Perceptions in different things.
	6	Public Mind Activity for Family	
2. Public mind for school	7	My Friend	
	8	My Teacher	Learning Step: Consciousness in deep listening or Dialogue by using the cause and effect principle or practicing in Public Mind Activity.
	9	My School	
	10	Good things needed to do.	
	11-12	Public Mind Activity for School	
3. Public mind for society	13	When people and world were changed.	Conclusion Step: Reflection of thought, belief, and changes in oneself from learning.
	14	Good people of Society	
	15-17	Public Mind Activity for Society	
	18	Adjust oneself and adapt oneself by Public Mind.	

which was obtained by all 4 sessions of data collection by using one way repeated measure ANOVA in order to study the effect of curriculum usage from students' Public Mind Behavior, from self-assessment, peer evaluation, teacher evaluation, and parent evaluation. All 3 aspects of data analysis were presented including 1) public mind for family, 2) public mind for school, and 3) public mind for society. The evaluative findings of students' public mind behavior before learning during Week 6, Week 12, and after learning according to the program, were compared. The students' satisfaction on curriculum and the learning management based on Contemplative Education were measured and evaluated.

Instruments

The researcher developed the following instruments to help realize a proper evaluation on the student's changing behavior on public mind. These instruments were tested and approved by the experts earlier mentioned in the procedure above.

1. The Questionnaire of Problem and Need for Student Development.
2. The Learning Management Record.
3. The student's Diary.
4. The Public Mind Behavioral Observation.
5. The Public Mind Behavioral Evaluation from self-assessment, peer evaluation, teacher evaluation, and parent evaluation.
6. The students' satisfaction on curriculum and the learning management.

Data Collection

For research implementation, the researcher provided the learning management and collected data by herself as follows:

The quantitative data consisted of a questionnaire asking the

problem and need for student Development, the Quality Assessment Form of expert, the Public Mind Behavioral Observation, the Public Mind Behavioral Assessment including the students self-assessment, peer evaluation, teacher evaluation, and parent evaluation, and the students' satisfaction on curriculum and the learning management. At the end of the evaluation, the researcher came out with a satisfactory scale ranging from 1-5 of which 1 indicates the least satisfaction, 2 indicates fairly satisfied, 3 indicates satisfied, 4 indicates more satisfied, and 5 indicates the most satisfied. Thereafter, the average was calculated from the scale as follows from 1.00 - 1.50, = least satisfied, 1.51-2.50=fairly satisfied, 2.51 - 3.50 = satisfied, 3.51 -4.50 = more satisfied, 4.51-5.00 = the most satisfied. The researcher's evaluation conclusions were derived from four different groups of evaluators; the students assessed themselves by using the public mind behavioral evaluation form, the peer were randomly selected and they used the peer evaluation form, six teachers teaching in the same grade evaluated using the teacher's evaluation form, parent's evaluated using the parent's evaluation form. The evaluation was carried out in four phases. The first phase before learning; the second phase after six weeks of studies; the third phase after twelve weeks studies; and finally the fourth phase after the end of the studies.

The qualitative data consisted of the learning management record, the students' diary, and the Public Mind Behavioral Observation. The content was classified by specified issues such as the opinion of the students from the classroom activities, the benefit to the students from the activities and finally the suggestions from the students. On the part of the researcher, the results from the public mind behavioral observation records were used.

RESULTS

The basic information from the survey of problem and need for curriculum development, found that the problem
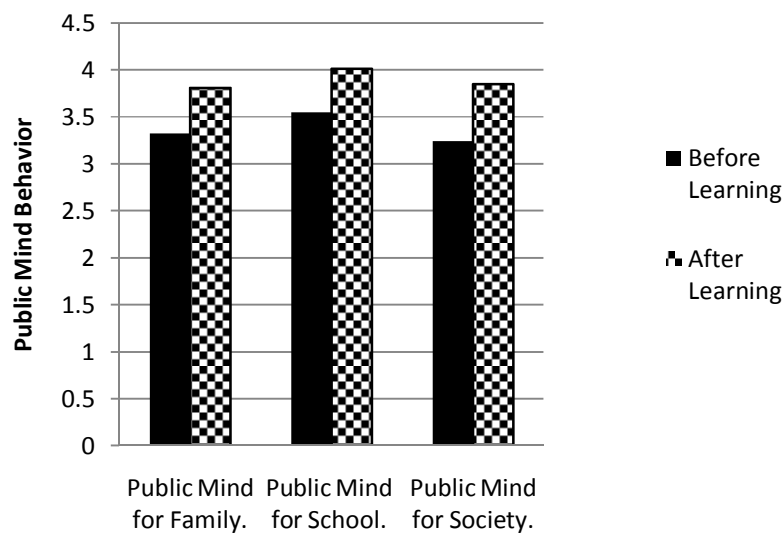
Figure 1. The Chart of Pubic Mind Behavior before learning and after learning of the curriculum use.

Table 2. The mean and standard deviation of students' public mind behavior.

Public Mind Behavior	The Mean of Students' Public Mind Behavior							
	Before Learning		Week 6		Week 12		After Learning	
	$\overline{\mathrm{X}}$	SD	$\overline{\mathrm{X}}$	SD	$\overline{\mathrm{X}}$	SD	$\overline{\mathrm{X}}$	SD
1. Public Mind for Family.	3.32	0.50	3.57	0.46	3.72	0.49	3.81	0.52
2. Public Mind for School.	3.55	0.50	3.59	0.45	3.94	0.49	4.01	0.49
3. Public Mind for Society.	3.24	0.46	3.36	0.49	3.45	0.50	3.85	0.51
Average	3.37	0.49	3.51	0.47	3.70	0.49	3.89	0.51

of current Thai society was caused by the people in society lacked good awareness for 25%. The students' desirable characteristic needed to de developed, included "the Learning Oriented," for 18.11%, and "the Public Mind," for 17.41%.

The developed curriculum consisted of 4 factors including: 1) the objective, 2) the learning substance, 3) the learning management, and 4) the measurement and evaluation. The curriculum provided the learning management based on Contemplative Education consisted of 5 processes including: (1) Perceptions from different things, (2) Deep listening, (3) Dialogue, (4) Practice, and (5) Reflection. There were 3 Steps of the learning management including: the Preparation step, the Learning step, and the Conclusion step.

The findings of curriculum use, public mind behavior before learning and after learning are shown in Figure 1. The findings of curriculum use, in overall, are shown in Table 2 and Figure 2.

The findings of curriculum usage are classified into

each aspect as follows: The students' public mind behavior for family from 4 sessions of measurement was significantly higher at .05 level as shown in Figure 3, Tables 3 and 4.

The students' public mind behavior for school from 4 sessions of measurement was significantly higher at .05 level as shown in Tables 5 and 6 and Figure 4.

The students' public mind behavior from 4 sessions of measurement at .05 level are shown in Tables 7 and 8 and Figure 5.

The students had satisfaction on curriculum and learning management in "High" level ($\overline{\mathrm{X}}$ =4.37 SD = 0.47) as shown in Table 9 and Figure 6.

DISCUSSIONS AND CONCLUSION

The findings for developing a public mind curriculum on lower secondary level public school classes with the contemplative education methods could be concluded as
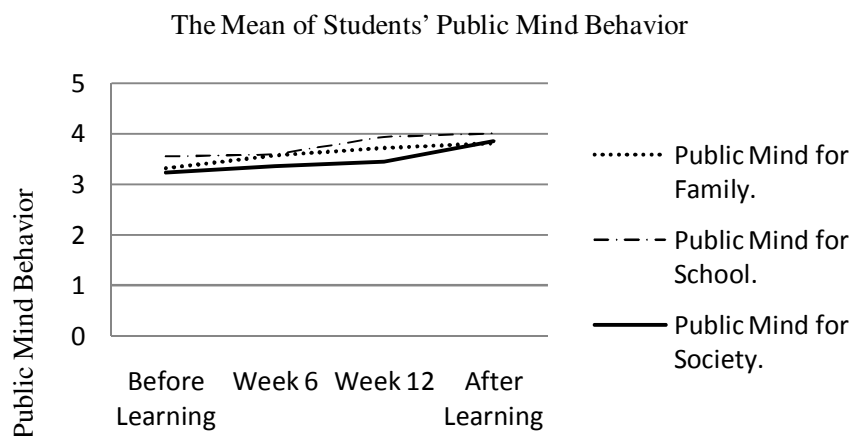
The Mean of Students' Public Mind Behavior

Figure 2. The chart of the public mind behavior in each aspect based on duration of the curriculum use.

Pubic Mind Behavior in each aspect based on duration of curriculum use
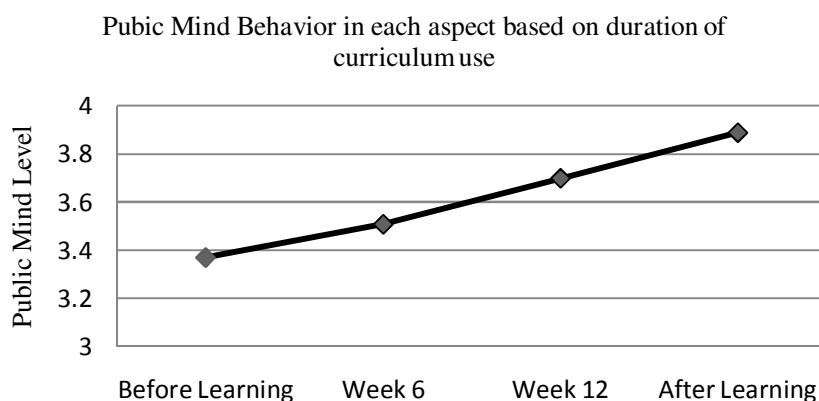

Figure 3. The students' public mind behavioral Level based on duration of curriculum use.

follows:

According to the survey of foundation data, it was found that the that the current problem of Thai society was caused by the lack of people's good awareness about their own society. These survey findings were further supported by an opinion survey of Suandusit Poll, Suandusit Rajabhat University conducted in 2010 with 5,374 people. The survey research data found that most of the people (92.02%) thought that the current social problem was now higher than in the previous year, because people in society did not have respect for law. The guidelines used towards addressing, and ultimately solving this problem should be the development of campaigns directed towards achieving the development, and importance of maintaining good ethics, character, and good morality within the society's people. Therefore education being an important component of society at all levels. The educational management systems should aim towards developing and enhancing the awareness of good ethics, and morality know as public mind into all of societies throughout the country. Education is human development especially in adolescents who ultimately grow up to become adult members of society in the future. The aim of National Education should be relevant to the characteristic of societies people throughout the country. Further research data collected from the Queen Sirikit National Institute of Child Health (2006) reported findings in adolescents' qualities. A case study of 3,000 people involving general students, and vocational students in Bangkok, Cholburi, Chiengmai, Nakonrachasima, and Songkla found that the recent adolescents had no awareness of public mind. Adolescents' perceptions of their communities were that they appeared weak, and were uninteresting for them.

Table 3. The mean and standard deviation of public mind behavior for family.

Public mind behavior	The mean of public mind behavior							
	Before learning		Week 6		Week 12		After learning	
	$\overline{\text{X}}$	SD	$\overline{\text{X}}$	SD	$\overline{\text{X}}$	SD	$\overline{\text{X}}$	SD
1. Be generous, helpful, and care for one's family member.	3.80	0.41	4.08	0.30	4.17	0.36	4.24	0.43
2. Love, obey, and practice based on father and adult's instruction.	3.22	0.55	3.54	0.48	3.61	0.47	3.72	0.51
3. Do not get involved in narcotics.	3.18	0.53	3.41	0.50	3.49	0.52	3.62	0.51
4. Be courteous and aware of circumstance.	3.40	0.54	3.68	0.47	3.77	0.48	3.85	0.56
5. Be reasonable and respectful of others decision making.	3.35	0.49	3.55	0.50	3.69	0.51	3.76	0.57
6. Be responsible to one's assigned housework.	3.63	0.49	3.80	0.44	3.83	0.47	3.87	0.52
7. Be helpful for other housework even when it's not the owner's duty.	2.42	0.50	2.94	0.45	3.33	0.52	3.53	0.55
8. Spend money sufficiently, and be aware of its value.	3.22	0.45	3.42	0.50	3.72	0.56	3.78	0.55
9. Use water and electricity economically.	3.53	0.56	3.67	0.47	3.84	0.49	3.92	0.45
10. Buy one's personal utensils based on necessity and usefulness.	3.46	0.51	3.60	0.49	3.76	0.54	3.84	0.54
Average	3.32	0.50	3.57	0.46	3.72	0.49	3.81	0.52

Table 4. Paired comparison of public mind behavior for family.

Duration of Curriculum Use		Mean Difference (I-J)	Std. Error	Sig.a
(I) Time	(J) Time			
1	2	-.248*	.024	.000*
	3	-.402*	.030	.000*
	4	-.492*	.033	.000*
2	1	.248*	.024	.000*
	3	-.154*	.021	.000*
	4	-.244*	.019	.000*
3	1	.402*	.030	.000*
	2	.154*	.021	.000*
	4	-.090*	.018	.000*
4	1	.492*	.033	.000*
	2	.244*	.019	.000*
	3	.090*	.018	.000*

*Statistical Significance at .05 level.

There was participatory activity, and people in the community ignored the religion, as well as dishonest. These issues eroded the society's economic sufficiency and unity among the people that made up the communities. Most of the samples were children with grade point average = 3. More than 25% of them, had grade point average = 3.5. In addition, more than 90% of them lived with their parents and a warm caring family. They had no public mind. As a result, they were classified into 2 polar: the high achievers, and the low achievers. The high achievers would join in with the group. But, the low achievers would try to do different risky behaviors in order to create more social space for themselves.

Consequently, the findings of Thai children's evaluation could be concluded that "Thai children wanted to be good at learning, but their lack of Public Mind." It was congruent with curriculum "When children are grown up, they wouldn't cheat" of Bangkok with the viewpoint that every one of us was a social member. Everyone wanted to live in a good society and be happy. The better society would be based on its members who had to collaborate in developing and helping. When the social members lived together, they had to be dependent on generosity and understanding with each other. Besides, the members of society had to think and do for the public. They should give for society, and shouldn't take personal benefit. They

Table 5. The mean and standard deviation of public mind behavior for school.

Public Mind Behavior	The mean of public mind behavior							
	Before learning		Week 6		Week 12		After learning	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
1. Be Helpful for school work based on one's ability.	3.84	0.42	3.78	0.42	4.20	0.47	4.22	0.47
2. Obey the teacher's instruction with respect.	3.88	0.46	3.90	0.34	4.23	0.42	4.32	0.48
3. Be responsible for one's assigned work.	3.40	0.58	3.32	0.53	3.87	0.59	3.97	0.58
4. Volunteer to help with other classroom work even it's not one's duty.	2.92	0.58	3.12	0.35	3.53	0.53	3.59	0.57
5. Do not write on the table, chair, and wall in class.	3.10	0.46	3.17	0.43	3.60	0.51	3.64	0.52
6. Share and provide the opportunity for friends to use things together.	3.55	0.50	3.59	0.50	3.81	0.43	3.87	0.50
7. Be Generous towards one's friends and teachers.	4.14	0.37	4.19	0.41	4.47	0.51	4.55	0.51
8. Use the public resources economically.	3.54	0.51	3.61	0.50	3.88	0.51	3.96	0.44
9. Be Helpful for Cleanliness in School.	3.50	0.55	3.58	0.53	3.87	0.49	3.97	0.47
10. Collaborate in maintaining the school property.	3.64	0.51	3.69	0.47	3.94	0.46	3.97	0.42
Average	3.55	0.50	3.59	0.45	3.94	0.49	4.01	0.49

Table 6. The paired comparison of public mind behavior for school.

Duration of curriculum use		Mean difference (I-J)	Std. Error	Sig.a
(I) Time	(J) Time			
1	2	-.039	.027	.944
	3	-.387*	.034	.000*
	4	-.453*	.038	.000*
2	1	.039	.027	.944
	3	-.348*	.026	.000*
	4	-.414*	.031	.000*
3	1	.387*	.034	.000*
	2	.348*	.026	.000*
	4	-.066*	.013	.000*
4	1	.453*	.038	.000*
	2	.414*	.031	.000*
	3	.066*	.013	.000*

*Statistical significance at .05 level.

should be ready to protect the public benefit. The inculcation of public mind for young people would be an important foundation in creating good people who were not only be intelligent or be good at learning but preferred to take advantage of other people. They should be good persons who would be able to hold the society together as well as develop the country. In all levels of young children, the practice would be started from small society, for instance, public mind in school or community (Department of Education Bangkok Metropolitan Administration, 2011). Furthermore, it was supported by Yingruxpund's (2007) approach regarding the public mind that is developed by inculcation from childhood and it would be gradually developed to adolescent and adulthood. Therefore, the adults had to understand children's nature, and suggest to them the right things. They should advise and inculcate Public Mind for them. Moreover, children had to be disciplined and responsible according to their nature. They could learn discipline from the culture based on the other persons' instruction as well as environment as natural regulations for living together in society, the participatory activity and usage of things in society, the Public Mind Development for children in using common things and property, the generosity in sharing things. When the curriculum was tried out, it was notable that the content in learning units
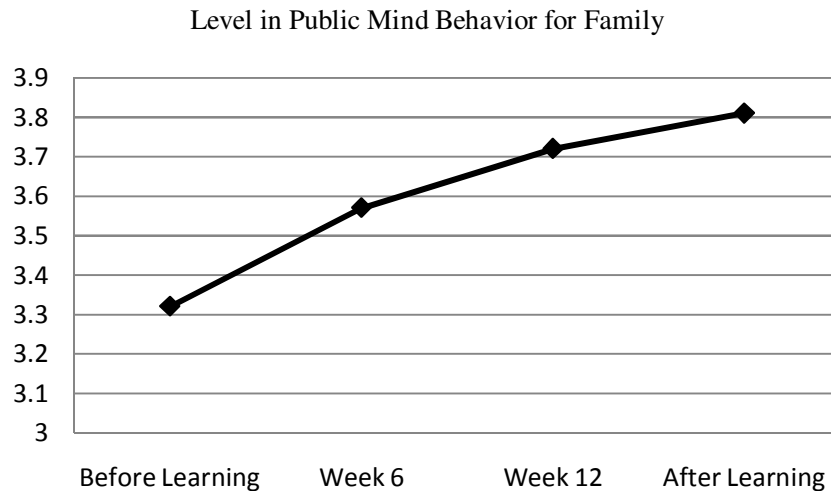
Level in Public Mind Behavior for Family

Figure 4. Chart of level in public mind behavior for family from curriculum use.

Table 7. Mean and standard deviation of public mind behavior for society.

| Public mind behavior | The mean of public mind behavior | | | | | | | |
| | Before learning | | Week 6 | | Week 12 | | After learning | |
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
1. Follow the Law and Tradition.	3.71	0.51	3.72	0.48	3.77	0.42	3.98	0.50
2. Follow the Religious Instruction.	3.28	0.46	3.34	0.48	3.56	0.51	3.60	0.50
3. Promote and Participate the community activity based on one's opportunity.	2.87	0.34	3.10	0.50	3.15	0.54	3.67	0.47
4. Mercy and Support those who are in a lower position.	3.38	0.50	3.53	0.51	3.55	0.51	4.11	0.51
5. Do not get involved in the path of ruin and addicted substances.	3.86	0.50	3.95	0.56	4.07	0.59	4.29	0.49
6. Be Responsible for what is wrong.	3.18	0.48	3.35	0.48	3.49	0.50	3.84	0.62
7. Dump Garbage in garbage bins.	4.15	0.40	4.22	0.41	4.26	0.42	4.41	0.50
8. Use water and electricity economically.	3.35	0.48	3.45	0.51	3.51	0.51	3.82	0.42
9. Use a Plastic Bag when it is necessary.	2.41	0.50	2.55	0.50	2.65	0.51	3.40	0.56
10. Try to use what is produced from natural substances.	2.19	0.40	2.38	0.50	2.49	0.53	3.33	0.48
Average	3.24	0.46	3.36	0.49	3.45	0.50	3.85	0.51

was provided; the students would increase their Public Mind Behavior obviously. Consequently, the students should be enhanced to learn various contents with their mind and intelligence in learning as well as experience by doing which would cause new attitude and the effect of frequent action would cause one's belief in those things leading to the changes inside oneself as well as students' behavioral sustainability.

The developed curriculum consisted of 4 Sub-factors based on Taba's (1962) approach, found that the curriculum had to include 4 Sub-factors as follows: 1) the Objective, 2) Learning Substance, 3) Learning Management, and 4) Measurement and Evaluation which

referred to framework for development by enhancing the students to accomplish goal. Therefore, the implementation of this study was focused on developing the curriculum that included content material, activities that cater for public perception. Integrated with learning process based on contemplative education by providing the three steps within learning management for each hourly lesson taught, including: the step of preparation learning, and conclusion. The learning as contemplative education was different from prior kinds of learning. The emphasis was on the students learning though practicing by themselves. The teachers could use learning based goals through various types of media. Clear examples

Table 8. Paired comparison of public mind behavior for society.

Duration of curriculum use		Mean difference (I-J)	Std. Error	Sig.a
(I) Time	**(J) Time**			
1	2	-.120*	.018	.000*
	3	-.212*	.022	.000*
	4	-.607*	.036	.000*
2	1	.120*	.018	.000*
	3	-.093*	.013	.000*
	4	-.487*	.037	.000*
3	1	.212*	.022	.000*
	2	.093*	.013	.000*
	4	-.395*	.035	.000*
4	1	.607*	.036	.000*
	2	.487*	.037	.000*
	3	.395*	.035	.000*

*Statistical significance at .05 level.

Level in Public Mind Behavior for School
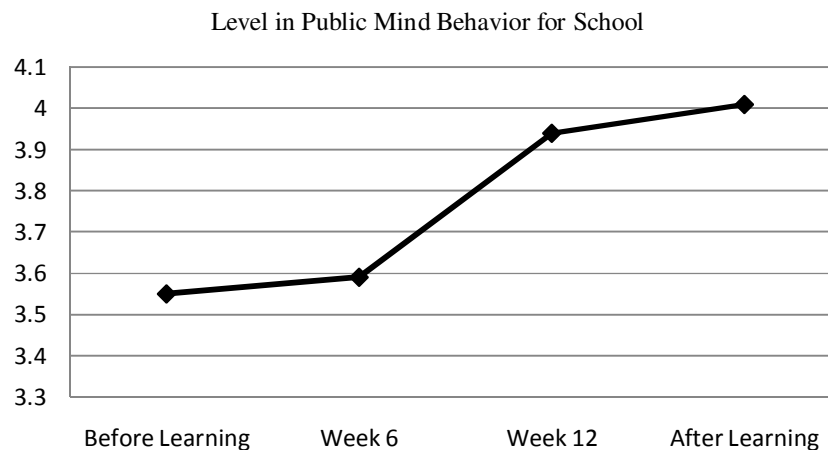
Figure 5. Chart of public mind behavior for school from curriculum use.

Table 9. Mean, standard deviation, and students' satisfaction on curriculum and learning management.

Evaluation List	$\overline{\text{X}}$	SD	Satisfaction Level
Learning Subjects	4.35	0.47	High
Learning Management	4.27	0.45	High
Learning Media and Source	4.31	0.46	High
Measurement and Evaluation	4.53	0.51	Highestt
Total	4.37	0.47	High

are video tapes, books articles, and other online links; students having access to these different media types in different social contexts. The different media types would help stimulate motivation levels helping maintain enthusiasm in students learning. Students would be able associate self-thought together with prior preconception
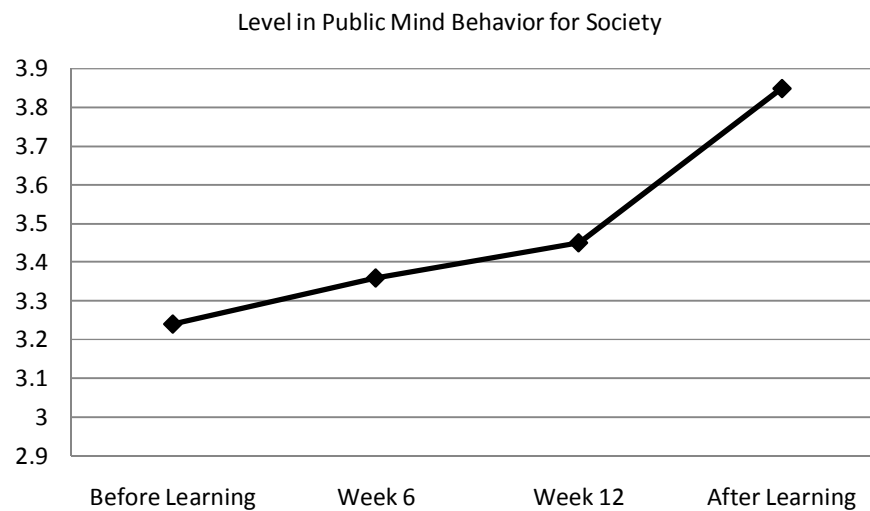
Level in Public Mind Behavior for Society

Figure 6. Chart of public mind behavior for society from curriculum use.

This leads to learning through deep listening.   Since the students would be conscious, opened for listening for evaluating the situation, able to make their decision by identify and analyzing what they had listened to without bias. Then, teachers would provide pleasant dialogues: the students knew and shared with other persons in a positive way. The students could present under social rule and regulation in order to lead towards the group goal, and the students could have real practice since they are learning by doing in different activities themselves. This they would have perception, sensation, and feeling towards those practice truly. The last step of Learning was aimed for students to obtain reflection which the students would be able to present their ideas by synthesizing the knowledge they had discovered by themselves or associated with their prior knowledge, for proposing or discussion in order to provide feedback indicating their real self. Besides, to understand the students in measurement and evaluation in order to accomplish curriculum goals which would be evaluated from actively participating as well as provision of students' public mind by comparing the students' Public Mind Behavior between before learning and after learning in the curriculum. The students wouldn't feel being under pressured with the criterion for judging their learning performance. As a result, the learning climate was relaxed.   It was supported by Sutirat's (2010) suggestion that in order to provide the students' public mind, it should emphasize on the students to learn from various techniques from learning by doing as well as repetitive practice continuously without being in a hurry. All aspects of learning should be provided including the Cognitive domain, Affective domain, and Psychomotor domain. It was enquired to be based on the factor affecting students'

Public Mind occurrence in both the inside and outside of themselves. Consequently, the activity management in "Promotion for Virtue, Beauty, and Value in society should be performed. In addition, the students should be provided learning and participation in activity strictly at least for 1 h each week. The researcher expected that when the students learned from this program, they would grow up to become adults who had public mind as well as participating in creating their society and country to be peaceful in the future.

The developed curriculum for students 'changes and improves public mind behavior in all of 3 aspects, they had satisfaction on the Public Mind Curriculum and learning management as follows:

The public mind for family found that it was caused by one's attempt to develop the awareness to be occurred in students so that they would view the importance as well as impact of public mind, the learning from the things forming interest, as well nearby stories; participation in learning and reflection on their own public mind, their friends, their teachers, and their parents. These things would help the students to receive and see their own worth. It was congruent with research findings of Yingruxpund's (2007) found that the record of public mind behavior with the opinion and suggestions by their friends and teachers, the practice findings every week from the score of the observational form which was periodically informed by the researcher. The findings of development were improved. Furthermore, the reward was given for encouraging the students to be easy for expressing their behavior. As a result, the students had higher public mind development.

The public mind for school found that there were no differences in public mind between Week 6, and before

learning. It might be due to the first 6 weeks, aimed to learn the content and participate in activities related to public mind for family. Therefore, there were no differences in evaluative findings of public mind behavior.

The public mind for society, found that the students had increased public mind behavior gradually. It might be because the students understood the Learning Process based on Contemplative Education. The increased duration would cause their self confidence in playing their role, function, and responsibility for different things.

The students had satisfaction on both of Curriculum and Learning Management, in overall, in "High" level". It was because the content material or activity being learned from the curriculum was relevant to the current situation and problem of current society. It was variety and interesting. The Learning based on Contemplative Education caused the students to learn from real practice. It helped the students to open their worldview for learning. As a result, they were satisfied as well as happy with learning this program.

In summary, according to the study of the curriculum use, there was a notable conclusion that the Learning Management related to the learning unit could help students to express the increased Public Mind Behavior obviously. The Learning Process based on Contemplative Education, could affect the students good attitude towards Public Mind. In addition, the regular repeated behavior would cause the students to view that the expression of public mind behavior, was a normal thing. Besides, learning from storied at hand by behavior for family, friend, and society with content and activity that could be adjusted and flexible according to the students' interest, these things were able to cause the students' satisfaction on both of the Curriculum and the Learning Management in "High" level. Byrnes (2009) suggested that the instruction by Contemplative Education was the teachers' third alternative since Contemplative Education was one's Transformative Learning in different levels. There was basic change in oneself by adapting one's feeling and thought regarding to human beings as well as the nature through various activities and processes. It was supported by research findings of Kienngam (2010) Organizing Teaching-Learning to Develop Thinking and Public Mind in Guidance Activity Subject of Matthayom Suksa 3 students of the Chiangmai University Demonstration School students and to study changes in thinking, the public mind and the academic achievement of the Demonstration School students. The subjects of this research were 44 students from Mathayom Suksa 3 / 4 at Chiangmai University Demonstration School. This research was conducted during the first semester of the academic year 2009. Instruments were used to collect the data by a record of observations, a record of interview, a record of teaching practice and a record of student learning. The data were then classified, analyzed and presented by narrative text. The results showed that

most students have the correct standing of the public mind, have higher academic achievement and the students were pleased with the instructional activities provided by the researcher. The study showed that the teaching – learning by inserting various forms of activity such as asking questions, videos, observation forms and group work focusing on public mind study helped students develop themselves on public mind. And it was supported by research findings of Sukkamart's (2010) curriculum development for enhancing Pratomsuksa 4 Students' desirable characteristics based on Contemplative Education for 20 weeks, 2 h each week; total of 40 h. The objective of Supamad's research was to enhance the students' desirable characteristics. The research findings found that the developed curriculum could develop the experimental group students' desirable characteristics including: one's awareness of oneself, kindness as well as mercy, and public mind which were changed during the posttest in higher level than those of controlled students group. Moreover, the students had their satisfaction on the activity management based on the program in "the Highest" level.

Conflict of Interests

The authors have not declared any conflicts of interest.

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Full Length Research Paper

The role of university students' attitude towards Turkish language lesson in interpreting reading strategies

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In this study, the aim is to measure the effect of students' reading strategies and attitudes towards Turkish language on reading habits. 323 first grade students receiving education in 2014-2015 semester in International Antalya University located at the center of Antalya were involved in the study. As the method, relational screening model was used because the degree of two variables was determined. Metacognitive reading strategies and the Turkish language were handled in the literature section. In the study, the role of the attitude towards Turkish language was discussed with the studies carried out in this regard. As a result of the analyses, it was concluded that while general reading strategies was meaningful, the results in the fields of problem solving and strategy support were not meaningless. In addition, when descriptive statistics and correlation values are analyzed, it is seen that there is significant and positive correlation between metacognitive reading strategies and attitudes towards Turkish language course. In the results of the research, it is understood that there is significant and highly positive correlation between students' metacognitive awareness level and their problems solving skills. Solving problems and strategy support fields must be improved in increasing reading habits and developing reading strategies. To increase the influence of the Turkish language courses in reading skills, carrying out activities and implementations for reading in these courses will raise reading habits and awareness.

Key words: Reading, reading strategies, attitude, Turkish language.

INTRODUCTION

Reading

It is seen that reading habits affect reading strategies and attitudes of university students towards Turkish language and reading strategies like other people and academic groups. In this context, it can be said that reading is a skill that affects a person's mental satisfactions. Reading,

as a process of what the person perceives according to his level of competence from the complement of visual and sensual components can be considered one of the information channels in the world. This information flow can be taken much further with continuity. According to Koç and Müftüoğlu (2008), reading enables the continuity of the existing values and culture and has an important

role in transferring them to the next generations. Apart from enabling information flow, reading brings along certain gains. These gains have influence on many subjects such as social relations, developing and enriching one's imagination, having a broader vision, adapting into the social environment, empathizing, being tolerant and unprejudiced, developing the creative and aesthetics emotions, criticizing the events and situations. Minskoff (2005) suggests that if this effect becomes a habit, it can be more effective. There are also some other issues in order to make reading a habit. Reading must be joyful and effective; reading studies must be carried out more often; reading improvement chart must be created and correct - fast reading must be provided.

Having a specific aim and strategy in approaches regarding reading is important in terms of gaining reading skills. Topuzkanamış (2009) expresses that there are many methods and strategies in the field of reading. Metacognitive strategies are one of those. Metacognition is generally defined as "thinking about thinking". In some studies, it can be seen that this term is defined differently. These definitions are different in many ways but all emphasize the role of the metacognition in investigating and regulating the cognitive processes. While being handled as a multidimensional structure, metacognition is a general term used for high level cognitive skills (Thorpe and Satterly, 1990). This term is also defined as a process of understanding what you read and a system that transmits a person's perception regarding the textual equipment to the metacognitive level. This system includes that the reader can benefit from prior knowledge, determine the goals he needs in order to understand what he reads, capture the point what the author of the text wants to tell, guess the meaning of the phrase in the text and predict the link between those involved in the text and his own life (Hacker, 2004).

Metacognition reading and strategies

As reading contains in itself physical and mental processes at the same time, there has been a lot of methods and strategies in this field. Metacognitive strategies are one of them. The overall objective of many studies in this field can be expressed as follows: "Raising 'strategic readers' by our education system presents importance in every respects. In this respect it is found worth examining whether the preservice teachers who will be the most important denominator of our education system use reading skills and reading strategies or not or how much they use those" (Topuzkanamış, 2009). According to Lucangeli and Cornoldi (1997), in terms of learning processes, metacognition involves the use and control of cognitive functions consciously. Metacognition (Doğanay, 1997) is a skill enabling self-learning and a

means to learn learning. Metacognition differences to emerge with cognitive awareness in human can be defined as self-control, self-regulation, self-assessment, exhibiting conscious behaviors and realizing learning methods. According to Flavell (1979) metacognition refers to one's knowledge concerning one's own cognitive processes or anything related to them, e.g., the learning-relevant properties of information or data. Metacognitive skills are related to the procedural knowledge required for the regulation and control of individual learning activities. If the individual plans learning, monitors and control it, this means that these skills are clearly revealed. This is also in question while reading.

Caron (1997) reveals this reading as metacognitive reading. This reading is an individual's control and awareness about his competence in monitoring, arranging and interpreting cognitive activities with an aim to understand a text. Babbs and Moe (1983) express that this process begins with the cognitive knowledge of the reader and ends with the use of strategic reading behaviors. Baker and Brown (1984) divide the metacognitive process into two as metacognitive knowledge and metacognitive experience. Experience in metacognitive reading occurs before, during or after reading. Metacognitive experience before reading is to have a full command of the topic and discover the requirements of the task to be completed. Metacognitive experience during reading involves cognitive strategies used to understand the text. Metacognitive experience after reading involves cognitive activities used to fulfil the tasks regarding the reading (Çakıroğlu, 2007). In these activities, metacognitive reading is applied intensely. The reason of this is that there are concrete statements.

According to Gelen (2003), there are three different strategies when certain steps to be taken in metacognitive reading and understanding strategies are considered. First of all, before reading all necessary steps should be taken. It can be logical to start with a question: what are the things to know about the text to be read? Following this question, it is important to remember what is known about the topic, visualize and take down notes about them. The content of the text should be reviewed and predictions should be made. Steps to be followed during reading should be determined, the text should be scanned quickly and the important points should be underlined. During reading, the text should be read once. After reading, it is important to compare the information gained during reading and the noted information before reading. During reading, the reader visualizes what he reads in the text and a content map should be created. During the second reading, the attention must be paid to the text and the reader should focus on the details by trying to understand word-sentence-paragraph relation-ship. At the same time, discussion of the understandability

of the text is one of the strategies to be applied during reading. When the text is understood, revising process beings. Discussion with others is also important. The process should be continued by using word-sentence-paragraph under-standing strategies and questions should be asked to the teacher, text or other students. Afterwards, the process should be completed by noting down the keywords and controlling whether the aim is fulfilled. Lastly, after reading activities should be performed. Sharing what is understood from the text with others, finding new clues, noting down what is understood with individual expressions, finding the main idea of the text, following the right path while reading the text, repeating what is learned and sharing them with others are the further steps to be taken in order to complete the reading process. All of these brings along the attitudes towards reading and Turkish language.

Attitude towards Turkish language

The education of Turkish as a mother language begins in the primary school and continues until the university education. Turkish education which is the last step of this process in universities is a common compulsory lesson in all departments except Turkish language and literature departments (Karataş, 2013). The main objective of this lesson *is developing comprehension skills, gaining expression skills and habits, creating listening and reading habits, enriching personal active and passive vocabulary, teaching basic grammar rules and creating language awareness* (Kavcar et al., 1995). Within this objective, any lesson including Turkish language given during primary, secondary or higher education fills a gap in terms of functionality. In high schools where general culture and general information are taught, in line with developing and changing world conditions, new regulations are adopted about these lessons and these innovations are reflected on the official curriculum in a programmed way. All these follow the principle of providing each Turkish citizen with the general information about the history and general culture (Vural, 2007).

According to Vural (2007), everyone has an important role in the creating of national identity, formation of individual personality and comprehension of the role that Turkish language is responsible in language-identity relationship. To accomplish this, students should be motivated and their attitudes towards Turkish language should be taken into consideration. Within the framework of these attitudes, the aim of the lesson is attempted to be achieved by giving aim-based lessons to the students. In this way, university students can enjoy while reading and their reading habits can improve. In addition, they will be able to use the language correctly in terms of understanding the context and the text.

Cemiloğlu (2004) states that the attitudes of university students towards Turkish language are effective in terms of understanding the structural and functional charac-teristics of Turkish language and improving the ability to use the language verbally and in written as well as having a mother language consciousness. It can be stated that a positive attitude towards Turkish language can have a positive impact on the improvement of reading strategies and make significant contributions to the students in order to be a good reader. Furthermore, these strategies help students to combine the information they have previously with the information they gain from the text. Another benefit of Turkish language and attitude in terms of developing reading strategies is that positive attitude towards Turkish language is considerably helpful for their academic successes. Students can use reading strategies to understand texts more efficiently and make better preparations for the next text (Gürses, 2002).

In the light of all these developments, it is understood that reading should be developed in every stage of education. One of these stages is universities. Approaches of higher education students regarding reading and the behaviors they exhibit on the language are effective in terms of gaining reading habit. The attitude towards Turkish language also shows the students' tendency in the language. In this context, language education given to students under literature and Turkish courses until the university education is provided within the scope of Turkish language in higher education. Generally, Turkish language lesson involves subjects such as language, development of the language, content of the language, culture and literature. Higher education students are encouraged about reading. When the studies carried out in the literature are analyzed, it is seen that there is not any research regarding the relation-ship between reading strategies and Turkish language attitudes. In addition, this study will contribute to the literature in terms of addressing the relationship between reading strategies and Turkish language attitudes. The aim of this study is to measure the effect of reading strategies and the attitudes towards Turkish language on reading habits.

RESEARCH DESIGN AND METHODOLOGY

The study was conducted by using relational screening model which is one of the quantitative research models. Relational screening models are the research models used to determine the degree of the variation among two or more variables (Karasar, 2009). Relational screening models enable better understanding of a fact by researching the possible relations. It can also be expressed that relational screening models are significantly beneficial for understanding and improving information (Balcı, 2001). Within this context, in this study it is aimed to measure the effects of university students' reading habits on their attitudes

towards Turkish language and reading strategies. 323 first grade students from International Antalya University were involved in the study. Six faculties sampling consists of these 323 students (Law, Economics and Administrative Sciences, Tourism, Arts, Foreign Languages and Engineering Faculties). The age range of participants is 18-23 and participants were taken as a whole, and analyzes were carried out.

Reading strategies in higher education and attitudes of students towards Turkish language are the main focus of our study. Since the study addresses one of the most important and updated issues of the life, it is significant to understand the context of the study (Fraenkel and Wallen, 2009). In study, it was aimed to draw conclusions about the whole universe by interpreting the data with a holistic view (Creswell, 2009). During the study, data regarding the detection of reading habit problems were obtained by using "Reading Strategies Metacognitive Awareness Scale" and "Turkish Language Attitude Scale". At the same time, descriptive statistics, correlation and multiple regression analyses were conducted in accordance with the approach of the study.

Data collection

In data collection process, 323 university students were involved in the study on a voluntary basis. During data collection process, "Attitude Scale towards Turkish Language Class" developed by Arslan (2012) and "Reading Strategies Metacognitive Awareness Inventory" developed by Öztürk (2012) were used. Attitude scale towards Turkish language class including twenty nine items consists of one dimension. Reading strategies metacognitive awareness inventory including thirty items consists of three sub-dimensions. In this three-factor inventory, the first dimension is "General Reading Strategy" with 13 items, the second is "General Problem Solving Strategy" with 8 items and the third is "Supporting Reading Strategies". The data were obtained with two measurement tools in a single session. The data were analyzed with SPSS 21.0 program.

The trustworthiness of the study is important for the repeatability of the research results (Yıldırım and Şimşek, 2008). According to Johnson (1997), the most important features for the tools used to collect quantitative and qualitative data are validity and trustworthiness. The results of the study should be accurate and trustworthiness should be ensured in order to solve the hypotheses presented in the study and obtain the right results. Validity and trustworthiness of the measurement tools used in the study were tested.

In the scale developed by Arslan (2012) for Turkish language lesson, seven statistical analyses were conducted (Cronbach Alpha coefficient, Kaiser-Meyer Olkin, Barlett's Test of Sphericity analysis, ScreePlot graphics, Factor analysis, Correlation analysis, t test). As a result of the studies, it was discovered that Item-Total score correlations of all items found in the scale are meaningful at p<0.01 importance level. In addition, Cronbach Alpha coefficient of the scale is 0.96, factor load of all items are above 0.60 and t values regarding the distinctiveness of the scale are also meaningful. In the light of these data, it was concluded that the final form of the scale was valid and it could be used to determine the attitudes towards Turkish language class. Validity and trustworthiness of Reading Strategies Metacognitive Awareness Inventory Turkish Form which is another measurement tool were performed by Öztürk (2012). Turkish and English forms were filled out by 29 students every two weeks. In the second stage, scale was applied to 250 students for validity-trustworthiness. For example, the correlation between scores obtained from the both forms was found as 0.96. It

was also found that the factors belonging to the scale had trustworthiness values between .76 and .85. Based on these findings, it can be said that Reading Strategies Metacognitive Awareness Inventory is a reliable and valid measurement tool to be used in the field of education.

FINDINGS

Analysis process of data was carried out in two stages. In the first stage, the relationship between metacognitive reading strategies and the attitude towards Turkish language was analyzed. Afterwards, descriptive statistics and correlation values were tabulated according to the variables. Descriptive statistics and correlation values are given in Table 1.

As shown in Table 1, there is a positive and significant relationship between reading strategies and the attitude towards Turkish language. In addition, there is a positive relationship between the attitude towards Turkish language and the three categories of cognitive reading strategies: "General Reading Strategies", "General Problem Solving Strategy" and "Supporting Reading Strategies". It can also be concluded that the attitudes of students towards Turkish language vary by reading strategies. In table 2, you can see multiple regression analysis results regarding whether there is a positive relationship between attitudes towards Turkish language and the three reading strategies metacognitive awareness sub-dimensions ("General Reading Strategy", "General Problem Solving Strategy" and "Supporting Reading Strategies").

Multivariate regression analysis results show that the attitudes of students towards Turkish language are compatible with the general reading strategies (β= .244, p<.05) consisting of mental and physical preparations regarding the text to be read. It is also seen that the attitudes of students towards Turkish language are not compatible with the dimensions of general problem solving (β= .042, p>.05) and supporting reading strategies (β= .225, p>.05). As a result, it can be stated that general reading strategies of students are determinant on their attitudes towards Turkish language class.

DISCUSSION AND CONCLUSION

One of the most important indicators of the level of development of a society is regarding reading as a vital activity and maintaining it constantly, on regular basis. At the same time consciousness to have books, tendency to form libraries in homes, habit to give book as a present and level of utilization from libraries are also another indicators which show a country gives importance to the reading activities. In developing countries such as Turkey,

Table 1. Descriptive statistics and correlation values regarding variables.

Variables	1	2	3	4	5	M	Sd
Attitude	1	.224[**]	.343[**]	.226[**]	.350[**]	101.35	17.63
Metacognition	.224[**]	1	.907[**]	.875[**]	.958[**]	103.79	20.60
General Reading Strategy	.343[**]	.907[**]	1	.685[**]	.840[**]	26.11	6.32
General Problem Solving Strategy	.226[**]	.875[**]	.685[**]	1	.750[**]	33.06	6.52
Supporting Reading Strategies	.350[**]	.958[**]	.840[**]	.750[**]	1	44.08	9.62

Table 2. Multiple regression analysis results.

Variables		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Model 1	(Constant)	72.495	4.961		14.612	.000
	General Reading Strategy	.601	.273	.244	2.203	.029
	General Problem Solving Strategy	.099	.221	.042	.446	.656
	Supporting Reading Strategies	.368	.200	.225	1.839	.067

R= .418; R^2= .175; $F_{(3-226)}$ = 15.987; p= .00.

gaining the habit of reading by young people is one of the important steps to be taken towards creating a conscious and developed society (Gönen et al., 2004). Numerous studies which cover reading habits in Turkey were done and nearly in all of these studies it is seen that Turkish people have the habits such as reading and using reading strategies, library utilization quite little. For this purpose, from the hypothesis that this general situation seen on Turkish public has similar appearance on college students, it is intended to measure the impact of the students' reading strategies and attitudes towards Turkish language to their reading habits. Basing the studies on this ground is necessary to compare the results with similar survey results which are carried out before.

When descriptive statistics and correlation values are analyzed, it is seen that there is a positive and significant relationship between metacognitive reading strategies and the attitudes of university students towards Turkish language. Gelen's empirical study (2003) suggests that Cognitive Awareness Reading Comprehension Strategy method has positive effects on the attitudes of university students towards Turkish language. The study conducted by Karatay (2010) shows that the students whose cognitive awareness levels regarding reading compre-hension are higher are more successful in their academic careers. In another study conducted by Balcı (2007), the relationship between students' metacognitive awareness skill levels and their competence levels in solving verbal mathematical problems was analyzed. As a result of this study, it was observed that there is a positive relationship

between students' metacognitive awareness level and their competence levels in solving problems. As a result, it can be stated that the role of attitude towards Turkish language in interpreting metacognitive reading strategies of 323 students educated in International Antalya University is important in terms of general reading strategies. However, this cannot be mentioned in general problem solving and supporting reading strategies. This situation showed that it is not the materials students read or problems about opportunities or time but rather they have difficulty in making sense of what they read and using them in real life and in problem solving. In order to increase reading habit and develop reading strategies, the fields of problem solving and strategy support should be improved. Performing activities and practices regarding reading in order to increase the effectiveness of reading skills is significantly important in order to create awareness about reading.

Conflict of Interests

The author has not declared any conflicts of interest.

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