International Journal
on
New Trends in Education
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Their Implications
(IJONTE)

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i

ii

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v

THE EFFECTS OF COOPERATIVE LEARNING METHODS
ON STUDENTS' ACADEMIC ACHIEVEMENTS IN SOCIAL PSYCHOLOGY LESSONS

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ABSTRACT

The purpose of this study was to investigate the effects of Group Investigation (GI) and the Reading-Writing-Presenting (RWP) method in cooperative learning on students' comprehension of social psychology lesson. This research included 107 first-grade students from two classes. For this research, each class was selected to test one teaching method. The first class was selected as the Group Investigation Group (n=52), the second was selected as the Reading-Writing-Presenting Group (n=55). The data was collected through the Academic Achievement Test. The results obtained from the data show that the Reading-Writing-Presenting method has a more positive effect on increasing students' academic knowledge and achievements in social psychology lesson than the Group Investigation method.

 Key Words: Group investigation, Reading-writing-presenting, Social psychology.

INTRODUCTION

Nowadays, student-centered teaching model, method and technique are used. One of the models in contemporary teaching is cooperative learning method. According to Slavin cooperative learning method is one of the most successfully explored instructional strategy in the history of educational research (Slavin, 1996). Cooperative learning method is effective in reducing prejudice among students and meeting the academic and social needs of at-risk students in terms of education (Sudzina, 1993). Cooperative learning method is an activity that increases the students' class participation, academic achievement and motivation toward learning (Polloway, Patton & Serna, 2001.) Cooperative learning method is neither an ordinary nor a group study. Cooperative learning method may be defined as an active education strategy with small groups in order that the students will develop the learning of both themselves and the group members (Abrami, Poulsen, & Chambers, 2004; Johnson, & Johnson, 1999). It contains a certain amount of togetherness of idea and goal. During these studies, the individual indicates an effort that supports the learning of both himself and his companions (Doymuş, Şimşek & Şimşek, 2005; Aksoy & Doymuş, 2011; Doymuş, 2007; Doymuş, Karaçöp & Şimşek, 2010; Fer & Çırık, 2007). In cooperative learning method individuals endeavors to support both their own learning and colleagues to learn (Doymuş, Şimşek & Şimşek, 2005; Aksoy & Doymuş, 2011; Doymuş, 2007;Doymuş, Karaçöp & Şimşek, 2010; Fer & Çırık,2007). Cooperative learning method can be defined as a learning approach that students help learn from each other creating a small mixed groups towards a common

purpose in an academic subject in both classroom and other environments, increased self-confidence and communication skills of individuals, strengthened the power of problem-solving and critical thinking and students participates actively in the process of education (Doymuş, Karaçöp & Şimşek, 2010; Avcıoğlu, 2012; Hwang, Shadiev, Wang & Huang, 2012; Tan, Wen, Jiang, Du & Hu, 2012; Turan, 2012). The academicals foundations of cooperative learning emerged the work of social psychologist, Morton Deutsch, who specialized in the study of social interdependence Deutsch studied the effects of different group structures on the process and outcomes of group efforts in a variety of social and work settings (Tanner, Chatman & Allen,2003). There are two major theoretical perspectives related to cooperative learning-motivation and cognitive. The motivational theories of cooperative learning emphasize the students' incentives to do academic work, while the cognitive theories emphasize the effects of working together. There are two cognitive theories that are directly applied to cooperative learning, the developmental and the elaboration theories. The developmental theories assume that interaction among students around appropriate tasks increases their mastery of critical concepts (Damon, 1984). When students interact with other students, they have to explain and discuss each other's perspectives, which lead to greater understanding of the material to be learned. The struggle to resolve potential conflicts during collaborative activity results in the development of higher levels of understanding (Bukunola & Idowu, 2012). The elaboration theory suggests that one of the most effective means of learning is to explain the material to someone else. Cooperative learning activities enhance elaborative thinking and more frequent giving and receiving of explanations, which has the potential to increase depth of understanding, the quality of reasoning, and the accuracy of long term retention (Johnson, Johnson, & Holubec, 1986).

The implementation of cooperative learning method many methods are used. These methods display diversity depending on the number of students, the social structure of the environment, the physical structure of the class and applied to the subject of the course and course (Maloof & White, 2005; Şimşek et al., 2008). Cooperative learning method has taken place of education activities for a long time. During this process, researchers have developed various methods and practices (McTighe & Lyman, 1988; Jones & Steinbrink, 1991; Almasi, 1995; Gambrell, 1996). The forefronts of these methods are Learning Together, Student Teams, Group Investigation, Let's Ask and Learn Together, Jigsaw, and the method. In this study, the Reading-Writing-Presentation and Group Investigation methods were used.

In RWP method, students are divided into heterogeneous groups that consist of 2-6 members in class taking into account the physical condition of the class where the course is processed, the number of students, and students' academic achievements (Şimşek, 2013). Reading-Writing-Presentation method consists of three stages. In the reading stage, all groups in the class read the topic of course using different sources that each student had brought during one lesson. In the writing stage, groups completed reading stage pass the stage of writing removing all sources. Students in all groups make a report of what they have learned during the class hours. Reports are evaluated by the author. As a result of evaluation the groups of low-grade return to the stage of reading. The groups of high-grade pass the stage of presenting. In the presentation stage groups makes presentations in the classroom about 20 minutes. After the presentation the points that wondering and unclear the relevant subject are discussed (Okur-Akçay, 2012) Group investigation is learning strategy that involves task specialization (Slavin, 1995). In this method, the class is divided into several groups that study in a different phase of a general issue. Group investigation: Expanding cooperative learning. Working in small cooperative groups, students investigate a specific topic. The study issue is then divided into working sections among the members of the groups. Students pair up the information, arrangement, analysis, planning and integrate the data with the students in other groups.. The information collected is then compiled into a whole and presented to the entire class (Sharan & Sharan, 1992).

In the literature, there are hundreds of studies showing that cooperative learning method is more successful than traditional methods in all respects (Yılmaz, 2007; Peterson &Jeffrey, 2004; Aksoy, 2006; Johnson and Johnson, 2005; Ahmad &Mahmood, 2010). However, there are very few studies comparing cooperative methods of their own (Aksoy &Gürbüz, 2013). The purpose of this study was to investigate the effects of GI and RWP on students' comprehension of social psychology lessons. Specifically, the effects of these methods on the students' academic achievement in social psychology lessons are examined. The specific research question

posed is: Are there any significant difference of using the Reading-Writing-Presenting method and Group Investigation methods on student achievements in social psychology lessons?

METHOD

In analyzing the effects of two different teaching methods in different classrooms, it is more convenient to use the quasi-experimental research design. A quasi-experimental design in which participants are not randomly assigned to the groups, instead, there are naturally occurring groups or groups to which participants are assigned for reasons other than randomizing the sample was used in this study. The study utilized ''a pre-test/posttest non-equivalent comparison group design'' (McMillan & Schumacher 2006). Effects of group investigation method and reading-writing-presenting method on social studies prospective teachers' academic achievement were sought. The participants consisted of two different classes of 107 second grade prospective teachers' social studies education department students who were attending social psychology course at Atatürk University in 20012 to 2013 academic year. One of the classes was randomly assigned as group investigation group (n= 55), and the other was randomly assigned as reading-writing-presenting (n= 52). In order to explore the differences between the two groups in their academic achievement in that course, Academic Achievement Test (AAT) was given to both groups as pre-tests at the beginning of the treatment. According to the data related to AAT scores, it was found that there were no significant differences among the participants. Both groups were applied different method to four weeks. Then posttest was performed.

Sample

This is a quasi-experimental study and designed as a Non-Equivalent Groups pre-test, post-test, and comparison group model. The sample of this study consisted of a total of 107 (57 male and 50 famale ; 20 and 25 ages) second grade social studies prospective teachers from different groups enrolled in a social psychology course for the 2012–2013 academic years. One of the treatment groups was the Group Investigation Group (GIG) (n=52), the second group was the Reading-Writing-Presenting Group (RWPG) (n=55). Groups were given prior information about the method. Before the beginning of the treatment, the author gave information about learning objectives, the instruction process, and rules of working in a cooperative group, roles, and assessment strategies.

Instruments

In this study, the Academic Achievement Test (AAT) was used. The AAT consists of 32 multiple-choice questions; each question is worth two points. The reason for using a multiple-choice test as a measurement tool is teacher candidates will take such a test to become a teacher. This test was created by the aouthor. This test was given to students who were not involved in the study but had previously taken the course in which the aforementioned force and motion topics had been taught. With respect to reliability, AAT was administered to a group of 46 students who had taken the social psychology course the year before. The reliability of AAT was found (α= 0.71). Author pointed out that the gains achieved with AAT related to the subjects of force and motion had been high in terms of the measurement.

Procedure
The Reading-Writing-Presenting Implemented

The RWPG students were randomly divided into eleven sub-groups. These groups were contained five students. The reading-writing-presenting method was carried out four weeks to teaching the "social psychology". The RWPG was employed for four weeks to teach social influence and conformity (St1), attitudes (St2), theoretical approaches to attitude change (St3), the process of attitude change (St4), The main features of the modified reading-writing-presenting methods are presented in three phases for each group in 1) in-class reading, 2) in-class writing, and 3) in-class presenting.

In class reading; all groups in the classroom read the topics for 30 minute from the course books or other resources which was included in the module for the week. In class writing; all groups wrote their understanding about what they read for 20 minutes without accessing resources. Writing was done by group pairs. After finishing the writing, the notes written by the groups were evaluated by the author. Groups whose evaluated

outcomes were not good enough sent back to groups for reading stage. After the groups finished reading and writing stages, three groups made presentations about the subject for 20 minutes. Then, after the presentation an argument discussed in the classroom.

The Group Investigation Implemented

The GIG students were randomly divided into two parts (Part I, n=26 students; Part II, n=26 students). The students in these parts were divided into ten sub-groups. Eight groups contained five students. Two groups contained six students. The GIG was employed for four weeks to teach social influence and conformity (St1), attitudes (St2), theoretical approaches to attitude change (St3), the process of attitude change (St4), The main features of the modified GI are presented in three phases for each module (Oh & Shin, 2005). The features are: 1) in-class discussion, 2) out-of-class investigation, and In-class presentation.

In-class discussion: 'students are organized into research groups', 'students get together in their groups for discussion', 'each group sets an inquiry topic within a given unit and makes a plan for investigation', 'during the discussion, group members use their textbooks to identify their own problems, questions, or issues and select a topic to study', and 'the teacher participates in the group discussion and the teacher's roles include encouraging students to select authentic topics that can be addressed in multiple ways'.

In out-of-class investigation: 'each student group carries out its investigation', 'the teacher helps students with their investigations', 'the teacher's roles include presenting sources of information, providing instruments for their study, and assisting students with difficulties', and 'each research group prepares an in-class presentation'.

In-class presentation: Week II: group A in part 1 was the presentation (offer) group while group A in part 2 was the inquiry (grill) group. While group A in part 1 presented the topics of St1, group A in part 2 questioned the group about their presentation and determined their weaknesses. Other students in the classroom also participated in the discussion. Week III: group B in part 2 was the offer group while group B in part 1 was the grill group. While group B in part 2 presented the topics of St2, group B in part 1 questioned the group about their presentation and determined their weaknesses. Other students in the classroom also took part in the discussion. The other grill and offer groups were organized in the same way as week II and week III.

FINDINGS

In order to determine the differences among the two treatment groups, an independent t-test was employed to determine whether a statistically significant mean difference existed between the GIG and RWPG with respect to AAT. There was no statistically significant mean difference two groups before reading-writing-presentation method and group investigation method were applied (t=1,576, p= 0,118) (table 1). The data indicated that there was a significant difference in social psychology between GIG and RWPG after reading-writing-presentation method and group investigation method were applied (t=2,975, p=0,004) (table1). Students in the RWPG scored significantly higher than those in the GIG after the implementation.

Table 1: Independent t-test Analyses of Pre-and Post-Test AAT Scores

Tests	Groups	N	X^a	SD	t	p
Post test	GIG	52	43,6	6,643	2,975	0,004
	RWPG	55	47,8	7,885		
Pre test	GIG	52	34,4	6,505	1,576	0,118
	RWPG	55	32,2	7,181		

a: maximum score =64

As seen in Table 1, according to the scores of the AAT pre-test, there was no difference between GIG and RWPG (t=1,576; p>.05.). This finding supports the assumption that the groups should be considered equal. However, according to the scores of the post-test, there was a significant difference between GIG and RWPG (t=2,975, p<.05). The results of this analysis show that reading-writing-presentation method is more successful than group investigation method.

CONCLUSIONS

In this section are discussed taking into account the results of the Group Investigation and Reading-Writing-Presentation method s of the cooperative learning model on pre-service social studies teachers' academic achievements of social psychology lesson. Also, the recommendations developed for applicators and researchers included in this section.

When Table 1 is examined, there is no difference between the groups for the AAT pre-test, but according to the scores of the post-test, there is a significant difference between GIG and RWPG. These results demonstrate that the RWP method has a more positive effect on increasing students' academic knowledge and achievements in social psychology lesson than the GI method. The results of the application of this method are consistent with the results of other studies in this area (Aksoy, Doymuş, Karaçöp, Şimşek & Koç 2008; Ainley 2006; Thurston et al., 2010).

The reason RWP method has a more positive effect than GIG method can be explained with writing stage and the use of visuals. The main purpose of reading texts offered to students during reading is to increase the amount of time allocated to the students to think (White & Gustone, 1989). Visually rich, prepared in accordance with the level of student posters or reading texts, to facilitate students' understanding, in the expression of learned information is very useful and convenient. The second stage RWP method is the writing stage. Writing is very important for the students learned to organize better, to understand and express (Hohenshell & Hand, 2006; Mason & Boscolo, 2000). The implementation phase of the third stage of the method of RWP students aims to learn by doing (Goltz, Hietapelto, Reinsch & Tyrell, 2008; Thompson & Chapman, 2004).

It is know that the achievement effects of cooperative learning more than the conventional lecture method (Gillies, 2006; Hennessy & Evans, 2006; Johnson, Johnson & Stanne, 2000; Bukunola & Idowu, 2012; Şimşek, 2012). In this study was made the comparison of two different cooperative methods. It is important for the literature the comparison of the methods of cooperative learning model with each other and other active learning methods. Therefore in this study was made the comparison of two different cooperative methods. In light of the data obtained from this study, three specific recommendations are drawn:

1.The comparison other methods of cooperative learning model should be made.
2.Similar studies can be done at all grades.
3.The methods of cooperative learning can be compared to other active methods.

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REFERENCES

Abrami, P. C., Poulsen, C. and Chambers, B. (2004). Teacher motivation to implement an educational innovation: Factors differentiating users and non-users of cooperative learning. *Educational Psychology*, 24, 201-216.

Aksoy, G. (2006). *İşbirlikçi öğrenme yönteminin genel kimya laboratuarı dersinde akademik başarıya, laboratuvar malzemesi tanıma ve kullanma becerisine etkisi.* Yayımlanmamış Yüksek Lisans Tezi, Atatürk Üniversitesi, Fen Bilimleri Enstitüsü, Erzurum.

Aksoy, G. ve Doymuş, K. (2011). Fen ve teknoloji dersi uygulamalarında işbirlikli okuma yazma-uygulama tekniğinin etkisi. *Gazi Üniversitesi Eğitim Fakültesi Dergisi,* 31(2), 43-59.

Aksoy, G., Doymuş, K., Karaçöp, A., Şimşek, Ü. ve Koç, Y. (2008). İşbirlikli öğrenme yönteminin genel kimya laboratuar dersinin akademik başarısına etkisi ve öğrencilerin bu yöntem hakkındaki görüşleri. *Kazım Karabekir Eğitim Fakültesi,* 17, 212-217.

Aksoy, G. & Gürbüz, F. (2013). Yer kabuğu nelerden oluşur ünitesinde grup araştırması ve birlikte öğrenme tekniklerinin öğrencilerin akademik başarılarına etkisi. *Electronic Journal of Social Sciences.* 12 (44), 202-213.

Ahmad, Z. & Mahmood, N. (2010) Effects of cooperative learning vs. traditional instruction on prospective teachers' learning experience and achievement*. Ankara University, Journal of Faculty of Educational Sciences*, 43 (1), 151-164.

Ainley, J. (2006). Devoloping interdependence: an analysis of individual and school influences on a social outcome of schooling. *Educational Psychology, 26* (2), 209-227.

Almasi, J. (1995). The nature of fourth-graders' sociocognitive conflicts in peerled and teacher-led discussions of literature. *Reading Research Quarterly*, 30, 314-51.

Bukunola, B-A. J. and Idowu, O. D. (2012). Effectiveness of cooperative learning strategies on nigerian junior secondary students' academic achievement in basic science. *British Journal of Education, Society & Behavioral Science.* 2 (3), 307-325.

Doymuş, K. (2007). Effects of a Cooperative learning strategy on teaching and learning phases of matter and one-component phase diagrams, *Journal of Chemical Education,* 84 (11), 1857-1860.

Doymuş, K., Karaçöp, A. & Şimşek, Ü. (2010). Effects of jigsaw and animation techniques on students' understanding of concepts and subjects in electrochemistry. *Educational Technology Research and Development*, 5, 671-691.

Doymuş, K., Şimşek, Ü. & Şimşek, U. (2005). İşbirlikçi öğrenme yöntemi üzerine derleme i:işbirlikli öğrenme yöntemi ve yöntemle ilgili çalışmalar. *Erzincan Eğitim Fakültesi Dergisi*, 7 (1), 59–83.

Fer, S. & Cirik, İ. (2006). Öğretmenlerde ve öğrencilerde, yapılandırmacı öğrenme ortamı ölçeğinin geçerlilik ve güvenirlik çalışması nedir?. *Yeditepe Üniversitesi Eğitim Fakültesi Dergisi.* 2 (1), 1-26.

Gambrell, L. B. (1996). Creating classroom cultures that foster reading motivation. *The Reading Teacher*, 50 (1), 14-25.

9

Gillies, R. M. (2006). Teachers' and students' verbal behaviors during cooperative and small group learning. *British Journal of Educational Psychology*, 76 (2), 271-287.

Goltz, S.M., Hietapelto, A.M., Reinsch, R.W., and Tyrell, S.K. (2008). Teaching teamwork and problem solving concurrently. *Journal of Management Education,* 32 (5), 541-562.

Hennessy, D. & Evans, R. (2006). Small-group learning in the community college classroom. *Community College Enterprise,* 12 (1), 93-110.

Hohenshell, M.L., and Hand, B. (2006). Writing-to-learn strategies in secondary school cell biology: A mixed method study. *International Journal of Science Education,* 28 (2), 261-289.

Hwang, W.Y., Shadiev, R., Wang,C.Y., & Huang, Z. H. (2012). A pilot study of cooperative programming learning behavior and its relationship with students' learning performance. *Computers & Education,* 58 (4), 12671281.

Johnson, D. W., Johnson, R.T., Holubec, E.J. (1986). Circles of learning: Cooperation in the classroom. Edina, MN: Interaction Book Company.

Johnson, D. W. & Johnson, R. T. (1999). Making cooperative learning work. *Theory Into Practice,* 38 (2), 67–73.

Johnson, D. W., Johnson, R. T. & Stanne, E. (2000). Cooperative learning methods: A meta-analysis. University of Minnesota, Minneapolis: Cooperative Learning Center, http://www.tablelearning.com/uploads/File/EXHIBITB.pdf.

Johnson, D. W. and Johnson, R. T. (2005). Co-operative Learning, R. M. Gillies and A. F. Ashman (Ed.) *Student Motivation in Co-operative Groups, Social Interdependence Theory,* London and New York, Taylor and Francis e-Library.

Jones, R. M., & Steinbrink, J. E. (1991). Home teams: Cooperative learning in elementary science. *School Science and Mathematics*, 91, 139–143.

Maloof, J. E. and V. K. B. White. 2005. Team study training in the college biology laboratory. *Journal of Biological Education*, 39 (3), 120-124.

Mason, L., and Boscolo, P. (2000). Writing and conceptual change: What changes?. *Instructional Science*, 28, 199-226.

McMillan, J. H. & Schumacher, S. (2006). Research in education: evidence-based inquiry. (Sixth Edition). Boston, MA: Allyn and Bacon.

McTighe, J., & Lyman, F. G., Jr. (1988). Cueing thinking in the classroom: The promise of theory-embedded tools. *Educational Leadership,* 47 (7), 18–24.

Oh, P. S. & Shin, M. K. (2005). Students' reflections on implementation of group investigation in Korean secondary science classrooms. *International Journal of Science and Mathematics Education,* 3 (2), 327–349.

Okur-Akçay, N. (2012). *Kuvvet ve hareket konusunun öğretilmesinde işbirlikli öğrenme yöntemlerinden grup araştırması, okuma-yazma-sunma ve birlikte öğrenmenin etkisi*. Unpublished Phd, Atatürk University, Erzurum.

Peterson, E. S. and Jeffrey, A. M. (2004). Comparing the quality of student's experiences during cooperative learning and large group instruction. *The Journal of Educultional Research,* 97 (3), 123-128.

Polloway, E. A., Patton, J. R., & Serna, S. (2001). Strategies for teaching learners with special needs. 7th Edition. Englewood Cliffs, NJ: Merrill Prentice Hall.

Sharan, S., and Sharan, Y. (1992). Group investigation: Expanding cooperative learning. New York: Teachers' College Press.

Slavin, R. E. (1995). Cooperative learning: Theory, research, and practice. (2nd ed.). Boston: Allyn & Bacon.

Slavin, R. E. (1996). Research on cooperative learning and achievement: What we know, what we need to know. *Contemporary Educational Psychology*, 21, 43-69.

Sudzina, M. (1993, February). Dealing with diversity in the classroom: A case study approach. A paper presented at the annual meeting of the Association of Teacher Educators, Los Angeles. (ERIC Document Reproduction Service No. ED 354 233).

Şimşek, U. (2012). The effects of reading-writing-presentation and group investigation methods on students' academic achievements in citizenship lessons. *Journal of Educational Sciences Research,* 2 (2), 189–201.

Şimşek, U. (2013) Effects of cooperative learning methods on social studies undergraduate students' achievement in political science. *Energy Education Science and Technology Part B: Social and Educational Studies.* Volume (issue) 5 (1), 619-632.

Şimşek, Ü., Doymuş, K., Karaçöp, A. (2008). Çözeltiler ünitesinde uygulanan grup araştırması tekniğinin öğrencilerin maddenin tanecikli yapıda anlamalarına ve akademik başarılarına etkisi. *Bayburt Üniversitesi Eğitim Fakültesi Dergisi*, 3 (I-II), 87-99.

Tan, W., Wen, X., Jiang, C., Du, Y.,& Hu, X. (2012). An evaluation model integrating user trust and capability for selection of cooperative learning partners. *Chinese Journal of Electronics*, 21 (1), 42-46.

Tanner. K., Chatman, L.S. & Allen, D. (2003). Approaches to cell biology teaching: cooperative Learning in the science classroom: beyond students working in groups. *Cell Biology Education: A Journal of Life Science Education, 2*, 1-5.

Thompson, J. C., and Chapman, E. S. (2004). Effects of cooperative learning on achievement of adult learners in introductory psychology classes. *Social Behavior and Personality,* 32, 139-146.

Thurston, A., Topping, K.J., Tolmie, A., Christie, D., Karagiannidou, E. and Murray, P. (2010). Cooperative learning in Science: Follow-up from primary to high school. *International Journal of Science Education, 32* (4), 501-522.

Turan S., Konan A., Kılıç Y. A., Özvarış S. B., & Sayek I. (2012). The effect of problem-based learning with cooperative-learning strategies in surgery clerkships. *Journal of Surgical Education*, 69 (2), 226-230.

White, R.T., and Gustone, R.F. (1989). Metalearning and conceptual change. *International Journal Science Education, 7*, 577-586.

Yılmaz, M. (2007). Görsel sanatlar eğitiminde işbirlikli öğrenme. *Kastamonu Eğitim Dergisi,* 15 (2), 747-756.

9

A COMPARATIVE STUDY FOR TEACHING CHEMISTRY THROUGH INDUCTIVE THINKING MODEL AND ADVANCED ORGANIZER MODEL

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ABSTRACT

The objective of the study is to compare the relative effectiveness of Inductive Thinking Model (ITM) and Advance Organizer Model (AOM) in teaching chemistry under two different boards/councils in relation to level of cognitive achievement of the students on the criteria of immediate learning and retention. The sample consists of 200 students from eight sections of four randomly selected schools situated at Purulia, Birbhum, Malda and Hoogly. The ($2 \times 2 \times 3$) factorial design was used for the study. At the beginning, an entry level test (ELT) has been administered to cheek the homogeneity of the groups and to categorize the students on the basis of their cognitive achievement. After administering the entry level test, four treatment groups have been formed. Gr I and Gr III have taught with AOM whereas Gr II and Gr IV taught with ITM for eight weeks. After experimentation, common standardized CRTs (post test)viz. CRT II and CRT III has been administered to all the sections. In order to test retention of the learnt knowledge, CRT IV, which is the combination of CRT II and CRT III has been administered after 15 days from the date of post test. Results indicate that that both ITM and AOM are equally effective on the criteria of immediate learning but AOM group establishes superiority than the ITM group on retention.

Key Words: Chemistry teaching, Inductive thinking model, Advance organizer model, Cognitive achievement.

INTRODUCTION

Teaching of science is not just handing out facts and information about science. Besides motivating and presenting things in an interesting way, the teacher must be able to create suitable learning experiences which reflect an atmosphere for students' self exploration, problem solving, inductive reasoning, etc.(Venvile and Dawson,2005) To achieve this, there are varieties of methods of teaching available and the teacher has to select such method or methods, which are suitable for the given set of students in a given context (Gilbert, 2011)). Most of the experts believed that teaching learning process is the key factor for understanding the concepts of chemistry. To adjust with the rapid explosion of knowledge of chemistry, the learners must be prepared to process information suitably and meaningfully so that the information can be treated for a longer time and can be used in different situations of life (Ray ,2008 ; Smith,2009). To accomplish these objectives, the learners have to frame a concept in his cognitive domain. Transfer of learning mainly depends on concept formation because these concepts are the key building blocks of the structure of knowledge.

Literature Review
Aziz (1990) conducted a study whose objectives was to compare the effectiveness of information processing model in the teaching of chemistry with traditional lecture method in relation to gender. The result of the analysis showed that the performance of the students taught through model approach was superior than the performance of the students taught through traditional approach.

10

Jamini (1991) investigated the relative effectiveness of AOM and CAM on conceptual learning efficiency and retention of chemistry concepts in relation to divergent thinking which indicated that although both AOM and CAM were effective in fostering concept learning, AOM was comparatively more beneficial in concept learning to pupil with high divergent thinking while CAM was more beneficial to pupils with low divergent thinking.

Remadevi (1998) conducted a study to find out the effectiveness of Information Processing Models (IPM) in the teaching of chemistry in comparison with the Conventional Method (CM) at Higher Secondary Schools of Kerala in relation intelligence and scientific attitude. The findings of the study revealed that the pupils taught through IPM were found to have significantly higher achievement than those taught through CM with respect to knowledge level of cognitive achievement, comprehension level of cognitive achievement and application level of cognitive achievement at .01 level.

Sreelekha and Nayar (2004) conducted a study to compare the achievement level between traditional method and concept attainment model in the teaching of chemistry with respect to knowledge, understanding and application objectives. The major finding was CAM was effective in improving the overall level of achievement in chemistry.

Domin (2008) used an advance organizer pertaining to the nature of science (NOS) aspect of the role creativity plays in science, incorporated into a problem-based laboratory activity of an undergraduate first-year chemistry curriculum. The results of this study indicate that the different versions of the advance organizer differ with respect to altering students' conceptualization of creativity: specifically, only the indefinite explication of the intended learning outcome led to a significant change in the percentage of students holding more informed views. This finding suggests that a relatively small change in instructional design can advance improvement in achieving NOS learning outcomes within a large-scale content-based science course.

Khan and Saeed (2010) conducted a study to investigate the effectiveness of concept formation teaching model over traditional method in the teaching of chemistry at IXth grade students' achievement. The results of the study indicated that concept formation teaching model was more effective as compared to traditional method. Furthermore, concept formation teaching model appeared to be favorable for both boys and girls for the understanding of Chemistry concepts.

Khan et al (2011), conducted a study to examine the effect of inquiry-based instruction as a supplementing strategy on the academic achievement of secondary school students in the subject of chemistry. The results of the study indicate that inquiry based instruction, as a back up strategy to support traditional teaching methods. Improved students' achievement in the subject of chemistry at secondary level with higher achievement gains for the groups of high achievers.

Although a few studies have been undertaken to develop instructional materials based on different teaching models for the teaching of science, but so far rare evidence of teaching chemistry at higher secondary level based on ITM and AOM has been noticed. To bridge this gap an attempt has been made in the present study. It is expected that the findings of the study would throw some ray of light to indicate the effective strategy for teaching chemistry at higher secondary level in West Bengal.

Objectives of the study
The Objectives of the study can be stated in terms of some specific objectives, which are:
1. To find out the relative effectiveness of ITM and AOM on cognitive learning in Chemistry on the criteria of immediate learning and retention.
2. To assess the effects of affiliating boards on cognitive learning in Chemistry on the criteria of immediate learning and retention.

11

3. To assess the interaction effects of Models of teaching, Levels of achievements and affiliating boards in chemistry on the criteria of immediate learning and retention.

Hypotheses

In order to carry the study smoothly , following null hypotheses have been framed :

$^{o}H_{1}$ **:** The effect of teaching through ITM and AOM do not differ significantly in teaching chemistry on the criterion of immediate learning.

$^{o}H_{2}$ **:** The effect of teaching to the students under two different boards/councils through either models do not differ significantly on the criterion of immediate learning.

$^{o}H_{3}$ **:**The effect of teaching between high, average and low achievers under two different boards/councils through either models do not differ significantly on the criterion of immediate learning

$^{o}H_{4}$ **:**There would be no significant first order interaction effects due to the variation of instructional models and the levels of achievements of the students on the criterion of immediate learning.

$^{o}H_{5}$ **:**There would be no significant first order interaction effects due to the variation of instructional models and the affiliating boards on the criterion of immediate learning.

$^{o}H_{6}$ **:**There would be no significant first order interaction effects due to the variation of levels of achievement of students and the affiliating boards on the criterion of immediate learning.

$^{o}H_{7}$ **:**There would be no significant second order interaction effects due to the variation of models of instruction, levels of achievement of students and the affiliating boards on the criterion of immediate learning.

$^{o}H_{8}$ **:** The effect of teaching through ITM and AOM do not differ significantly in teaching Chemistry on the criterion of retention of learnt knowledge.

$^{o}H_{9}$ **:** The effect of teaching to the students under two different boards/councils through either models do not differ significantly on the criterion of retention of learnt knowledge.

$^{o}H_{10}$ **:**The effect of teaching between high, average and low achievers under two different boards/councils through either models do not differ significantly on the criterion of retention of learnt knowledge

$^{o}H_{11}$ **:**There would be no significant first order interaction effects due to the variation of instructional models and the levels of achievements of the students on the criterion of retention of learnt knowledge.

$^{o}H_{12}$ **:**There would be no significant first order interaction effects due to the variation of instructional models and the affiliating boards on the criterion of retention of learnt knowledge.

$^{o}H_{13}$ **:**There would be no significant first order interaction effects due to the variation of levels of achievement of students and the affiliating boards on the criterion of retention of learnt knowledge.

$^{o}H_{14}$ **:**There would be no significant second order interaction effects due to the variation of models of instruction, levels of achievement of students and the affiliating boards on the criterion of retention of learnt knowledge.

METHODOLOGY

Population

The population of the study was the students, those who have taken Chemistry as an elective subject of higher secondary schools, affiliated by the W B C H S E and C B S E in West Bengal.

Sample

Multistage sampling technique was used to select sample. Students of four higher secondary school, two each from W B C H S E and C B S E from four districts namely, Purulia, Birbhum, Malda and Hoogly, selected randomly who opted Chemistry as elective subjects. The sample consisted of 200 students.

Factorial design for the study

In the present study the $(2 \times 2 \times 3)$ factorial design was used. This design is often used in classroom experiments when experimental and control groups are such naturally assembled groups as intact classes,

12

which may be similar (Best, 1999). Hence, without disturbing the natural settings of the classrooms, intact class groups were selected for the study.

Experimentation

The whole sample were divided into four treatment groups namely treatment group I to treatment group IV with a total sample of 200. Entry level test (CRT – 1) was administered to check the homogeneity of the group as well as to categorize the students as high, average and low achievers before giving the treatment to all the groups. Treatment group I and III were exposed with AOM while Treatment group II and IV were exposed with ITM. CRT – 2 and CRT – 3 were administered after the completion of treatments to measure the immediate learning. In order to check the retention of learnt knowledge, CRT- 4 was administered after 15 days.

Analysis and interpretation

In the present study eight section of four school was used as sample. So homogeneity of the was checked through Levene's test (Levene 1960). On the basis of scores obtained through the entry level test (CRT I) following ANOVA (Table I**)** table was constructed to check the homogeneity between different groups.

The 'F' value thus obtained was found to be 1.58 which is not significant even at 0.05 level. It indicates that all the groups taught through different models of teaching are homogeneous in nature.

Pertaining to $^oH_1$

It is observed from Tables 2 that the F ratio for the main effects of model (A) is 0.63 at df 1 which is not significant at 0.01 level on the criterion of immediate learning. It has also been found from the Tables 3 that the values of 't' between AOM and ITM is 1.00 for cognitive learning which is not significant even at 0.05 level of significance. So, the null hypothesis $^0H_1$ is accepted. It may, thus be interpreted that there is no significant difference between the mean achievement scores of all levels of cognitive learning under study to the effects of instructional models (AOM and ITM) on the criterion of immediate learning.

Pertaining to $^oH_2$:

F-ratio for the main effects of Boards under study (B) is 1.95 (Table 2) which is not significant at 0.01 level (p < 0.01) on cognitive learning on the criterion of immediate learning. 't' value (1.78) also indicates its non significant nature (Table 3). So, the null hypothesis $^0H_2$ is accepted. It may, thus be interpreted that there is no significant difference between the mean achievement scores of all levels of cognitive learning under different boards i.e. WBCHSE and CBSE on the criterion of immediate learning.

Pertaining to $^oH_3$:

Table 2 indicates that the F ratio for the main effects of level of cognitive achievement (L) is 78.81 at df 2 which is significant at 0.01 level (p < 0.01) on cognitive learning on the criterion of immediate learning. For the present study, level of cognitive achievement is stratified into three category i.e. high achievers, average achievers and low achievers. So further analysis was carried out using 't' critical ratio . From Tables 3 it is found that 't' value between high achievers and average achievers is 6.19, between high achievers and low achievers is 11.89 , between average achievers and low achievers is 6.58 which are significant at 0.01 level of significance. It may, thus be interpreted that there is significant difference exist between high achievers, average achievers and low achievers in the mean achievement scores on the criterion of immediate learning.

Pertaining to $^oH_4$:

From Table 2 it is observed that F-ratio for interaction between instructional models and level of cognitive achievement is 1.11 (df 2, 188) which is lower than that of theoretical value (F = 3.09 for df 2 and 188 at p<0.05) and consequently it is not significant even at 0.05 level of significance. Hence, the null hypothesis is accepted. Therefore, there is no significant first order interaction effects due to the variation of instructional models and the levels of achievement of the students on the criterion of immediate learning.

13

Pertaining to $^oH_5$:

Table 2 shows that F-ratio for interaction between instructional models and affiliating boards is 1.66 (df 1, 188) which is lower than that of theoretical value and consequently it is not significant even at 0.05 level of significance. This supports to accept null hypothesis. Therefore, there is no significant first order interaction effects due to the variation of instructional models and the affiliating boards on the criterion of immediate learning.

Pertaining to $^oH_6$:

Table 2 shows that F-ratio for interaction between level of student cognitive achievement and affiliating boards is 0.26 (df 2,188) which is lower than that of theoretical value and consequently it is not significant even at 0.05 level of significance. Hence, the null hypothesis $^oH_6$ is accepted. Therefore, there is no significant first order interaction effects due to the variation of levels of achievement of students and the affiliating boards on the criterion of immediate learning.

Pertaining to $^oH_7$:

It is found from Table 2 that the 'F'-ratios for the second order interaction effects of A,B and L (A × B × L) are not significant at 0.01 level (p>0.01) but significant at 0.05 level for cognitive learning on the criterion of immediate learning. F-ratio for degree of freedom (df) 2 and 188 is 3.29 which is higher than that of theoretical value (F = 3.09 for df 2 and 188 at p<0.05) but lower than that of F-ratio (F= 4.82 at df 2 and 188 at p<0.01) at 0.01 level of significance. So, the null hypothesis $^0H_7$ is accepted at 0.01 level but rejected at 0.05 level.

Pertaining to $^oH_8$:

F ratio for the main effects of model (A) is 7.71 at df 1 and 188 which is significant at 0.01 level (p < 0.01) on cognitive learning on the criterion of retention of learnt knowledge (Table 4) . 't' critical ration between AOM and ITM is 6.11 for cognitive learning which is also significant at 0.01 level of significance (Table 5). So, the null hypothesis $^0H_8$ is rejected. Hence, there is a significant difference exist between the mean achievement scores of all levels of cognitive learning under study to the effects of instructional models (AOM and ITM) on the criterion of retention of learnt knowledge.

Pertaining to $^oH_9$:

It is observed from Tables 4 that the F ratio for the main effects of boards under study (B) is 0.00 at df 1and 188 which is not significant at 0.01 level (p < 0.01) on cognitive learning on the criterion of retention of learnt knowledge. It has also been found from the Tables 5 that the values of 't' between WBCHSE and CBSE is 0.05 for cognitive learning which is also not significant even at 0.05 level. So, the null hypothesis is accepted. Thus, there is no significant difference exist between the mean achievement scores of all levels of cognitive learning under different boards i.e. WBCHSE and CBSE on the criterion of retention of learnt knowledge.

Pertaining to $^oH_{10}$:

It is observed from Tables 4 that the F ratio for the main effects of Level of cognitive achievement (L) is 77.41 at df 2 and 188 which is significant at 0.01 level (p < 0.01) on cognitive learning on the criterion of retention of learnt knowledge. So, the null hypothesis $^0H_{10}$ is rejected. It may, thus be interpreted that there is significant difference exist between high achievers, average achievers and low achievers in the mean achievement scores on the criterion of retention of learnt knowledge. It has been found from the Table 5 that the values of 't' between high achievers and average achievers is 5.89, between average achievers and low achievers is 12.22 and between average achievers and low achievers is 6.48 which are significant at 0.01 level of significance. Therefore, a significant difference exist between high achievers , average achievers and low achievers in the mean achievement scores for retention of learnt knowledge.

Pertaining to $^{o}H_{11}$:

Table 4 shows that F-ratio for the interaction of instructional models and the levels of achievement of the students is 0.96 at df 2 and 1888 which is lower than that of theoretical value (F = 3.09 for df 2 and 188 at p<0.05) and consequently it is not significant even at 0.05 level of significance. Hence, the null hypothesis is accepted. Therefore, there is no significant first order interaction effects due to the variation of instructional models and the levels of achievement of the students on the criterion of retention of learnt knowledge.

Pertaining to $^{o}H_{12}$:

F-ratio for the interaction between affiliating board and instructional models is found to be 1.54 at df 1 and 188 (Table 4) which is lower than that of theoretical value and consequently it is not significant even at 0.05 level of significance. Hence, the null hypothesis is accepted. Therefore, there is no significant first order interaction effects due to the variation of instructional models and the affiliating boards on the criterion of retention of learnt knowledge.

Pertaining to $^{o}H_{13}$:

From Table 4 it is observed that F-ratio for the interaction of level of students' cognitive achievement and affiliating boards is 1.65 (df 2,188) which is lower than that of theoretical value. Hence, the null hypothesis is accepted. Therefore, there is no significant first order interaction effects due to the variation of levels of achievement of students and the affiliating boards on the criterion of retention of learnt knowledge.

Pertaining to $^{o}H_{14}$:

Table 4 shows that F-ratio for the second order interaction between three variables is 2.34 at df 2 and 188 which is less than that of theoretical value. Hence, the null hypothesis is accepted Therefore, there is no significant second order interaction effects due to the variation of levels of achievement of students and the affiliating boards on the criterion of retention of learnt knowledge.

DISCUSSIONS

Immediate learning

Regarding the effects of model, the findings of the study revealed that in case of immediate learning the achievement of students on total cognitive level under Advanced Organizer Model (AOM) and Inductive Thinking Model (ITM) did not differ significantly. It can be concluded from the finding that none of the model establishes superiority over other for teaching chemistry at the higher secondary level on the criterion of immediate learning. The finding mostly corroborates the other finding of the studies of Chitrive (1983), Pandey (1986), Jamini (1991), Gupta (1993), Agarwaal (2004), Sadhu and Singh (2005) and Wanjari (2005).

The reason of this finding may be due to the fact that both the AOM and ITM belong to the information sequenced. AOM is sequenced in deductive manner, whereas ITM is inductively sequenced. Both the models help in strengthening the cognitive structure, which lead to the cognitive development of the students. Cognitive development takes place through the cognitive processes which refer to those process through which knowledge is appeared and maintained. Hence, cognition is a processes acquiring information and understanding the world. From the findings of the present study it may be inferred that students learn the content in Chemistry and retain that in a better way through the properly sequenced information processing models, viz., AOM & ITM. It is also noticed that to collect information and to develop the basis knowledge level learning in both the models is found effective.

Retention of learnt knowledge

The ability to recall is a great asset in learning although remembering cannot be equated with learning. The knowledge gained just after the exposure to the new method is no doubt important, but what is more

15

important is the amount of knowledge retained with lapse of time after the exposure. The finding of the study highlighted that the mean achievements scores differ significantly when taught with AOM and ITM. It was found that the rate of forgetting under Advanced Organizer Model is 6.14% which was less than the rate of forgetting under Inductive Thinking Model (15.77%). Hence it may be concluded from the result that in case of long - term effects the Advanced Organizer Model may be better than that of Inductive Thinking Model. Findings of many studies, like Borine (1982), Chitrive (1983), Kaushik (1989) and Ghosh (1989) corroborate the finding of the present study but the work of Healy (1985) does not support the finding of the present study. In AOM students' get opportunity to discover the concept within their own structure because of the presentation of the organizer in advance. It help the learner in conceptualizing the facts easily resulting involvement of student's in the teaching – learning process. As of these factors inherent in the AOM, the students may be enabled to retain and reproduce larger amount of information.

Affiliating boards

Affiliating Boards was taken as one of the main independent variables in this study. The finding of the present study indicates that on the criterion of immediate learning as well as the retention of learnt knowledge the student under both the boards i.e. CBSE and WBCHSE does not shows any effective impact on their achievement.

Students' achievement level

The present study also conducted with another main independent variable, i. e., students' level of achievement. The finding reveals that mean achievement scores of high achievers differs significantly than that of average and low achievers on the criterion of immediate learning and retention of learnt knowledge. This may lead to conclude that the higher mental ability of high achievers has a directed impact on the achievement on immediate learning and retention of learnt knowledge irrespective of treatment models and affiliating boards. The parallel studies on models on teaching by Singh (1994), Ramdevi (1998) and Khan et.al. (2011) corroborate the finding of the present study.

On the criterion of immediate learning, the result of the study revealed that the mean achievement scores of high achievers, average achievers and low achievers was not significant when taught through AOM and ITM. Most of the time students remain passive recipient of the information. Apathy, non-involvement and low level of participation may have resulted in poor achievement of low achievers. It indicates that the performance of low achievers are independent of teaching strategies. But in case of retention of learnt knowledge mean achievement scores of high achievers, average achievers and low achievers differs significantly. It was found that retention capacity of high achievers, average achievers and low achievers are higher when taught with AOM than that of ITM. Hence, it may be said that in case of retention, intelligence, which is highly correlated with the level of achievement has a positive impact on their retention of learning. A few exceptions have been found in the results, i. e., average achievers and low achievers under CBSE did not show any significant difference in mean achievement scores on the criteria of retention of learnt knowledge.

First order interaction effect

In case of first order interaction effects between instructional models and affiliating Boards, it has been found the interaction effect under both the model viz. Advanced Organizer Model and Inductive Thinking Model did not differ significantly on the criterion of immediate learning. But in case of retention of learnt knowledge AOM is found to be effective than that of ITM for both the affiliating boards. The content of the curriculum under CBSE and WBCHSE is almost equivalent. That is why strategies did not affect the students' learning process.

Second order interaction effect

Second order interaction effects among three independent variables; instructional models, students' achievement levels and affiliating boards on students' achievement, the findings lead to conclude that second order interaction effects of three independent variables on two treatment groups do not differ significantly on

16

all levels of cognitive learning on the criterion immediate learning but in case of retention, significant effect exist. The present study indicates that the combined interaction effect of three independent variables; instructional models, students' achievement levels and affiliating boards has no differential impact on two treatment groups. But this does not mean that there is no effect of model, students' achievement levels and affiliating boards on the criteria on immediate learning. Actually, all these variables of learning have more or less equal effect on both the treatment groups.

CONCLUSION

Effective classroom transactions are the prime area of teaching profession. A professional teacher seems to be an effective classroom teacher too. Since the theory of teaching is yet to be developed, endeavors have been stated to empirically verify the theoretically idea models of teaching into the classroom practices. Present study indicates some new focus towards the application of models of teaching in teaching Chemistry under the impacts of some variables like boards and level of students cognitive achievement. This finding may help the practicing teachers in their real classroom situations. Of course further studies in this field may be also throw new lights in the areas of teacher education course of our country.

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REFERENCES

Agarwal R. R. (2004) *A study of effect of teaching strategies in relation to creativity on conceptual learning of class XI students of commerce*, NCERT publication, New Delhi.

Aziz T. (1990), *Comparative effectiveness of the information processing models of teaching in developing certain concepts in chemistry at secondary stage,* Ph.D. Dissertation, Jamia Millia Islamia.

Borine, R. C.(1982): *The effects of advance organizers of varying length on the comprehension and retention of seventh grade students.* ,Ph. D. Dissertation, University of Wisconsin—Madison.

Best, J. W. (1977): *Research in education*: (3rd Ed.); Prentice – Hall of Indian Pvt. Ltd., New Delhi.

Chitrive, U. G. (1986): *Ausubel Vs. Burner model for teaching mathematics*; Himalayan Publishing House, Bombay.

Domin (2008): Using an advance organizer to facilitate change in students' conceptualization of the role of creativity in science, *Chemistry Education Research and Practice*, Vol. 9, pp. 291-300.

Ghosh, S K (1989), *Effectives of variation in advance organizers on the cognitive subsumption of life science*, Ph.D. Dissertation, University of Kalyani.

Gilbert, S.W, (2011), *Models –based science teaching*, NSTA Press, Virginia.

Gupta N.K., (2010) *Research in teaching of science,* APH Publishing Corporation, New Delhi

Healy, V.C. (1985), *The effects of advance organizers and prerequisite knowledge passage on the learning and retention of science concepts,* D. Ed Dissertation, State University of New York At Albany.

Jamini, N (1991), *Effects of teaching strategies on conceptual learning efficiency and retention in relation to divergent thinking*, Ph. D. Dissertation, University of Delhi.

Khan, A.S and Saeed, S (2010), Effect of teaching chemistry through concept formation teaching model on students achievement, *International Journal of Academic Research,* 2 (6), 230-234.

Khan, M. S., Hussain, S., Ali, R., Majoka, M. I., Ramzan, M (2011) Effect of Inquiry method on achievement of students in chemistry at secondary level, *International Journal of Academic Research,* 3 (1), 955-59.

Koushik, N K (1988), *The long-term effect of advance organizers upon achievement in biology in relation to reading ability, Intelligence and scientific attitude,* Ph. D Dissertation, Devi Ahilya Vishwavidyalaya.

Levene, H. (1960). *Robust tests for equality of variances*. Stanford University Press. pp. 278–292.

Pandey S.N (1986), *Effectiveness of advance organizer and inquiry training models for teaching social studies to class VIII students*, Ph.D. Dissertation, Banaras Hindu University.

Ray, B. (2008) *Modern methods of teaching chemistry*, APH publishing

Remadevi, K., (1998), *Application of information processing models in teaching chemistry at the secondary and higher secondary levels.* Ph.D. Dissertation, Mahatma Gandhi University.

Sidhu, R.K. and Singh, P. (2005), Comparative study of concept attainment model, advance organiser model and conventional method in teaching of physics in relation to intelligence and achievement motivation of class IX students, *Journal of All India Association for Educational Research*, Vol. 17, pp 89-92.

Singh, S.N.(1994), *Comparison of inductive thinking model with traditional method of teaching economics to Class XI students in terms of selected cognitive variables*. Ph.D. Dissertation, Devi Ahilya Vishwavidyalaya,

Smith, A. (2009), *The teaching of chemistry*, General Books LLC.

Sreelekha and Nayar (2004) : *The effectiveness of concept attainment model in learning chemistry at secondary level* .NCERT publication New Delhi.

Venvile, G. and Dawson, V. (ed) (2005), *The art of teaching science*, Allen and Unwin.

Wanjari, S. S. (2005). *Effectiveness of concept attainment model and inductive thinking model of teaching on students achievement in science, scientific creativity and attitude towards science*, Ph. D. Dissertation, Sant Gadge Baba Amravati University.

TABLES

Table 1: ANONA for entry level test (CRT I)

Source of Variance	Sum of Sq.	df	Mean Sq.	F
Between Groups	465.715	7	66.53	1.58^{ns}
Within Groups	8087.68	192	42.12	

ns = not significant

Table 2: Showing the Analysis of variance for cognitive learning on the criteria of immediate learning.

Source	Sum Square	df	Mean Square	F
B : Board (CBSE & WBBSE)	52.22	1	52.22	1.95^{ns}
A : Models (AOM & ITM)	16.94	1	19.94	0.63^{ns}
L : Levels (High, Medium & Low)	4226.41	2	2113.21	78.81^{**}
B × A : Board × Method	44.39	1	44.39	1.66^{ns}
B × L : Board × Levels	13.93	2	6.97	0.26^{ns}
A × L : Method × Level	59.72	2	29.86	1.11^{ns}
B × A × L	170.47	2	85.24	3.29^{*}
Error	5041	188	26.81	

ns = not significant,   ** = significant at 0.01 level i.e. $p < 0.01$,
* = significant at 0.05 level i.e. $p < 0.05$

Table 3: Showing 't' value for main effect on the criteria of immediate learning

Sl No	Between	N		Mean		Standard deviation		df	't' value
		n_1	n_2	M_1	M_2	σ_1	σ_2		
1	$A_{1 \times} A_2$	100	100	34.39	33.80	6.52	7.35	99	1.00^{ns}
2	$B_{1 \times} B_2$	100	100	33.58	34.61	7.44	6.38	99	1.78^{ns}
3	$L_{H \times} L_A$	48	48	40.03	34.34	3.65	5.82	47	6.19^{**}
4	$L_{H \times} L_L$	48	48	40.03	26.88	3.65	6.69	47	11.89^{**}
5	$L_{A \times} L_L$	48	48	34.34	26.88	5.82	6.69	47	6.58^{**}

ns = not significant,   ** = significant at 0.01 level i.e. $p < 0.01$

Table 4: Showing the Analysis of variance for total cognitive learning on the criteria of retention of learnt knowledge

Source	Sum Square	df	Mean Square	F
B : Board (CBSE & WBBSE)	0.05	1	0.05	0.00^{ns}
M : Methods (AOM & ITM)	772.24	1	772.24	27.41^{**}
L : Levels (High, Medium & Low)	4346.89	2	2173.45	77.14^{**}
B × A : Board × Method	43.25	1	43.25	1.54^{ns}
B × L : Board × Levels	92.80	2	46.40	1.65^{ns}
A × L : Method × Levels	53.82	2	26.91	0.96^{ns}
B × A × L	132	2	66	2.34^{ns}
Error	5296.89	188	28.17	

ns = not significant,   ** = significant at 0.01 level i.e. $p < 0.01$

Table 5: Showing 't' value for main effect on the criteria of retention of learnt knowledge

Sl No	Between	N		Mean		Standard deviation		df	't' value
		n_1	n_2	M_1	M_2	σ_1	σ_2		
1	$A_{1 \times} A_2$	100	100	32.40	28.47	6.53	7.61	99	6.11^{**}
2	$B_{1 \times} B_2$	100	100	30.42	30.45	7.78	6.91	99	0.05^{ns}
3	$L_{H \times} L_A$	48	48	36.67	30.75	4.75	5.52	47	5.89^{**}
4	$L_{H \times} L_L$	48	48	36.67	23.27	4.75	7.32	47	12.22^{**}
5	$L_{A \times} L_L$	48	48	30.75	23.27	5.52	7.32	47	6.48^{**}

ns = not significant,   ** = significant at 0.01 level i.e. $p < 0.01$

EFFECT OF A COMPUTER SOFTWARE
ON DISABLED SECOND LANGUAGE LEARNERS' ORAL READING FLUENCY

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ABSTRACT

This study explored how well using computer software can affect on improving English oral reading fluency for disabled learners. It showed how a using computer can reduce the impact of disability for disabled students on oral reading fluency. The focus of this article was specifically for software (natural reader software) applications designed for computer-based instruction in reading for students with learning disabilities. A total of 20 females with a mean age of 14 years old who were attending a public school in Ardabil were subjects of this study. These students were randomly divided into two groups. Group (1) consisted of 10 disabled students with using of the software instruction (experimental group) and Group (2): consisted of 10 disabled students without using of the software (control group). The control group simply attended in their ordinary classroom without using computer software and participated in instruction programs assigned by the teacher in the classroom. The experimental group attended in the computer lab and listened to the text as it is read by natural reader. After treatment sessions the results suggested that the natural reader software group did better than non-software group in oral reading fluency.

Key Words: Disabled students, Natural reader software, Oral reading fluency.

INTRODUCTION

Manivannan (2000) said, owing to lack of knowledge, educational access and technology, disabled children were initially treated as unwanted and segregated from other children. He believes that disabled children should be accepted without any restrictions in all the educational programs meant for other children. Up until now, educators and researchers have provided little attention to the disabled students' difficulties which they addressed in second language learning. One of the most difficult problems facing middle and secondary school teachers today is that many students come to class without the necessary skills to read and comprehend the written materials placed before them (Snow, 2002).

One kind of learning disabilities is reading disability, is common in Iranian students. Reading disability is a major obstacle to learning English as a second language. Much of what happens in a second language classroom is based on the reading. The majority of students have learning disabilities in the area of reading. Reading is central to learning; children who do not learn to read print by the second grade are likely to struggle with learning throughout their lives (Stanovich, 1985). Reading is the foundation of curriculum pursuits, students unable to read with success will experience difficulty in most curriculum areas (Zoref, Glang & Hall, 1993). Unfortunately, a trend observed in classrooms in that students with reading difficulties actually read less. They have less instructional time and less practice time. (Allington etal.,1989;Allington etal.,1995). Experts (Goering & Baker, 2010; Rasinski et al) claim that oral reading is an important part of skilled reading. Roundy and Roundy (2009) posit that students who do not achieve reading fluency at a young age are at a considerable disadvantage in all of their academic pursuits henceforth. , Allington (1983) points to the notion that oral

21

reading fluency is often neglected in instructional reading programs, causing comprehension problems and poor overall reading development. Fluency assessment is important because it is a valid indicator of overall reading competence (Fuchs, Fuchs, Hosp, & Jenkins, 2001).

What is reading fluency?
Lambert (2007) states , reading fluency consists of three components:
• Speed of reading
• Accuracy of reading
• Prosody (reading with expression)

Accuracy refers to the ability to correctly decode words. Rate is the time it takes to decode words, and is typically measured by counting the number of words read correctly in one minute. Prosody is appropriate phrasing and expression.

Possible signs of reading fluency disability
• Difficulty with phonemic awareness
• Difficulty with accurate word recognition
• Difficulty with fluent word recognition
• Difficulty with word decoding
• Difficulty with reading rate of fluency
• Difficulty with reading comprehension

So it's important to identify disabled students in reading fluency and to help them overcome the hurdles they face. To kick these obstacles away , we should provide disabled students new methods, to deal with their learning disabilities.

The advent of computers is one solution for providing equal educational opportunity and participation for students with disabilities. For children with disabilities computer can effect on their learning opportunities previously they hadn't these opportunities. The computer is a wonderful tool for students who have difficulty in learning. Making learning easier and enjoyable for disabled students is a very important objective for teachers. Educators have since discovered new methods of teaching students with learning disabilities. Since the first half of the 1980's personal computers have been used to support the education of children with profound and multiple learning disabilities in the UK. (Blenkhorn, 1996).

A number of computer software programs have been developed specifically for students with reading fluency difficulties. There are some of the computer softwares for reading that one of them was used in this study. (Natural Reader Software) The Natural Reader Software is a great aid for children with reading disabilities. This software allows them to listen to pages on the internet, alleviating his struggle trying to read from a computer screen with a magnifying glass. It is a wonderful and affordable software for disabled students. It makes reading more fun and pleasurable. It helps students process and have a better retainment of information. The quality of voices a viable, the ability to adjust the speed of speech is brilliant. The ability to copy text from places online and create audio files to listen to on an MP3 player is fantastic. It is invaluable when it comes to proofreading the students' work. These features can enhance comprehension and attention for students with specific learning disabilities. In natural reader programs, files are copied into the program and then are spoken by the computer. Generally the user has options to select different voices (male and female), change the speed the text is processed, and increase or decrease the size of the font. It is a great way to help the students overcome those pronunciation difficulties.

RQ: What is the effect of computer software (natural reader software) on disabled students' oral reading fluency?

22

RH1: The application of computer software(natural reader software) will affect the disabled students' oral reading fluency.

In this study, the computer software   was considered as the independent variable and disabled students' reading fluency score was regarded as the dependent one.

METHOD

Participant

On the basis of school psychologists and teachers' reports 20 disabled students were diagnosed. They were assured of anonymity and informed that their participation was entirely voluntary. Also all of these students were assessed by a physician for medical problems that could affect the students' ability to learn. All reported normal hearing and vision. A total of 20 females with a mean age of 14 years old who were attending a public school in Ardabil were subjects of this study. The students were divided into group (1) consisted of 10 students with using software (experimental group) and Group (2): consisted of 10 students without using of software (control group).

Procedure

The text was selected from their textbook in guidance school for both groups. Then, the control group simply attended in their ordinary classroom without using computer software and participated in instruction programs assigned by the teacher in the classroom. The experimental group attended in the computer lab and listened to the text as it is read by natural reader. The program comprised 2 weekly sessions lasting 30 minutes for two months for both groups.Two days before launching the treatment program a pre-test was administered. A pre-test was administered to make sure about the homogeneity of the two groups in terms of their level of oral reading proficiency.

Using software by the experimental group's teacher to read text

1. A new document was opened by clicking on the new icon
2. The text was copied and pasted into the reading window
3. It was clicked on the play arrow button to have the text read out loud.
4. It was clicked on the stop square to stop speech when it was needed.
5. In the reading window the words were highlighted as they were read.

This approach enabled students to hear the proper pronunciation of words they were unsure of how to pronounce, and in a way that was easy and allowed for infinite repetition. They were able to highlight sections of the text and repeat them over .

Experimental group read along with a software reader of the text several times. To get the most out of this step, students subvocalized quietly as they read along to make sure they weren't just listening to the software reader. Students practiced reading the text several times without the reader software. Over these treatment sessions a post test was administered to both groups.

Data analysis

To provide a statistical analysis in order to answer the research question, the collected data from posttest, were submitted to statistical analysis. The analysis consisted of a descriptive statistics and an independent t-test to compare the overall performances of two groups in order to see the effect of using natural reader software for improving disabled students' reading skill. From the scores obtained the following result was found (table 1).

Table1. Means and standard deviation obtained in post-test

	N	mean	SD
Software group	10	11.80	1.47
Non-software group	10	10.00	1.42

As the descriptive statistics in Table 1 indicates, software group had a higher mean and lower standard deviation in comparison with non-software group. This implies that in this test, software group did better than non-software group.
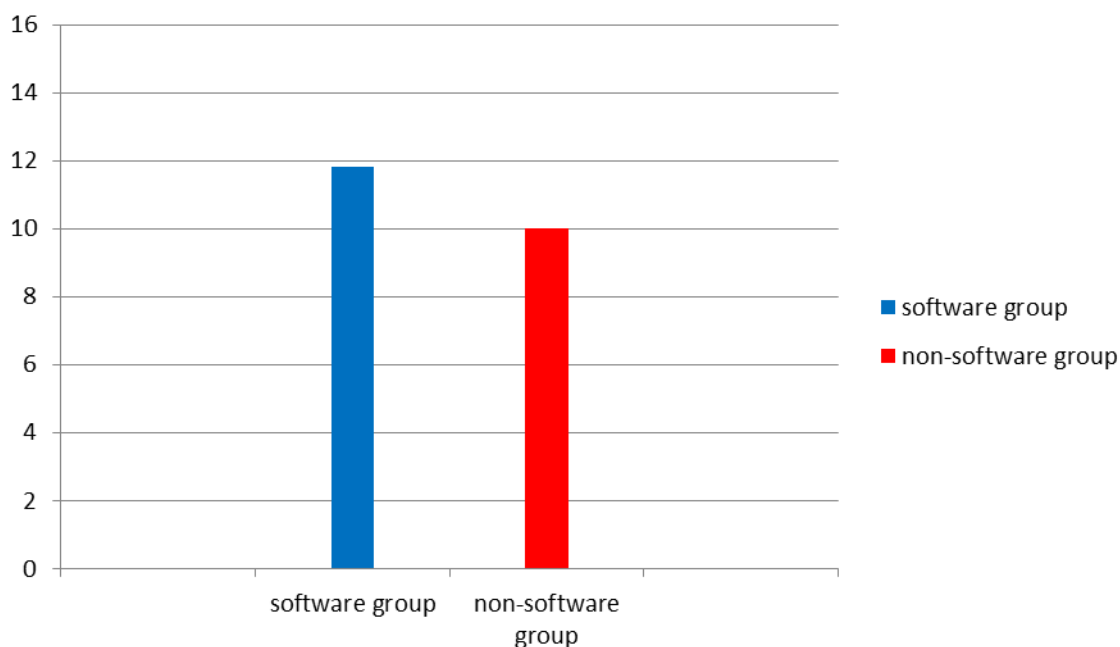
Figure1: Comparison of means obtained in post-test by two groups.

Figure 1 shows means for two participating groups on post-test. According to Figure 1, software group outperformed non-software group on post-test.

In this analysis the alpha was set at .05. Since the two-tailed significance value of .006 is less than alpha = .05, we can say there is a significant difference between the two groups.In sum, the research question was responded positively in that software program does have a significant effect on disabled students' reading fluency than ordinary method of reading fluency in the classroom.

CONCLUSION

The results of this study showed disabled students who have struggled with reading fluency for so long, benefit from reading software . Studies have found positive outcomes associated with the use of assistive technology for students with reading deficits (Balajthy, 2004, Boyle, Rosenberg, Connelly, Washburn, Brinckerhoff, & Banerjee, 2003). Fortunately , we as a teacher can provide to our disabled students several kinds of adaptive

24

technology program to assist learning. Students with disabilities have the right to an equal opportunity to use technology in their education. Our schools should improve their facilities to ensure equal opportunities for all students with disabilities. Our schools should open their doors to innovative thinking and using technology. Richard(2006) believes that technology offers us a means by which to make the familiar unfamiliar, to reframe and rethink our conceptions of language, communication, and society. It is through this process of analysis and reflection that we can best decide how we can and should use technology in language learning and teaching .

The computer can help disabled students compensate for challenges in second language reading and it can break down these students' barriers to learning. There are a number of questions for further research : How can we create a safe and comfortable place where these students can benefit from it? How can we guide disabled students in this type of learning. (computer-based) learning ? How we can launch some exciting and helpful program for students with disabilities to encourage more confidence and success in their academic, personal, and professional endeavors?

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REFERENCES
Allington, R.L. (1983). Fluency: The neglected reading goal. The Reading Teacher. 36 (6), 556-561.

Allington, R.L., & McGill-Frazen, A. (1989). School response to reading failure: Instruction for chapter 1 and special education students in grades 2, 4, and8. Elementary school Journal, 89, 529-543.

Allington, R. L., & Walmsley, S. A. (1995). Redefining and reforming instructional support programs for at risk students. In R. S. Allington& S. A. Walmsley (Eds.), No quick fix: Rethinking literacy in America's elementary schools(pp. 19 - 41). New York Teachers College Press and Newark, DE: International Reading Association.

Balajthy, E. (2004). Text-to-speech software for helping struggling readers. Reading Online. Blenkhorn, P. L. (1996). "The ROEVH project on computer assisted learning" , The British Journal of Visual Impairment, IV(3), PP. 161-163.

Boyle,E., Rosenberg, M., Connelly, V., Washburn, S., Brinckerhoff, L., Banerjee. M (2003), Effects of audio texts on the acquisition of secondary-level content by students with mild disabilities. Learning disability quarterly, 26, 2003.

Fuchs, L.S., Fuchs, D.F., Hosp, M.K., & Jenkins, J.R. (2001). Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis. Scientific Studies of Reading, pp. 5, 239-256.

Goering, C., & Baker, K. (2010). "Like the whole class has reading problems": a study of oral reading fluency activities in a high intervention setting. American Secondary Education, 39 (1), 61-77.

Lambert, M (2007). A Guide to Reading Fluency and the Assessment of Specific Learning Disabilities in the Individuals with Disabilities Education Improvement Act of 2004. Wisconsin Department of Public instruction.

Manivannan, M. (2000). Associate Publication of Asia Pacific Disability Rehabilitation Friday Meeting Transactions Journal. Vol 2 No.1.National Institute of Child Health and Human Development. (2000). Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction (NIH Publication No. 00-4769). Washington, DC: U.S. Government Printing Office.

Rasinski, T.V., Padak, N.D., McKeon, C.A., Wilfong, L.G., Friedauer, J.A., & Heim, P. (2005).Is reading fluency a key for successful high school reading? Journal of Adolescent and Adult Literacy, 49 (1), 22-27.

Roundy, A., Roundy, P. (2009). The effect of repeated reading on student fluency: does practice always make perfect? International Journal of Social Sciences, 4 (1), 54-59.

Snow, C.E. (2002) Reading for Understanding: Toward a Research and Development Program in Reading Comprehension. Rand Corp: Arlington, VA. Technology-Related Assistance for Individuals with Disabilities Act of 1988, P. L. 100-407.

Samuels, S. J. (2006). Toward a model of reading fluency. In S. J. Samuels & A. E. Farstrup (Eds.), What research has to say about fluency instruction (pp. 24-46). Newark, DE: International Reading Association.

Stanovich, K. E. (1985). Explaining the variance in reading ability in terms of psychological processes: What have we learned? *Annals of Dyslexia, 35,* 67-96.

Richard, K. (2006). Perspectives on Technology in Learning and Teaching language. TESOL QUARTERLY 40(2), 183 - 203.

Zoref, L., Glang, A., & Hall, T.E. (1993). Developing a volunteer reading program in your school: Strategies, success, and challenges; In J. Marr, G. Sugi, &G. Tindal(Eds.), The Oregon conference Monograph (pp. 15-21).

THE EFFECTS OF MULTIPLE INTELLIGENCE THEORY BASED TEACHING ON STUDENTS' ACHIEVEMENT AND RETENTION OF KNOWLEDGE (EXAMPLE OF THE ENZYMES SUBJECT)

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ABSTRACT

The purpose of this study is to compare theory of multiple intelligences with the traditional education method by looking at the science teachers' success, permanence of their information about enzyme subject. The research is experimental and it was carried out during 2010-2011 education year of Faculty of Education of Kafkas University, on Science Department's third grade students. In this research two impartial groups were formed and these two groups were used as control and experiment group. There were 30 students in control group and 30 students in experiment group. During the application, the lessons were given traditionally in control group, and in the experiment group; lessons were given according to multiple intelligence method. In the research, before application, the information level of students about enzyme was measured. After application the increase of their information was measured and four weeks later a success test was formed to determine the permanence of information. In the research a SPSS 16.0 package program was used to analyze the datum. To compare the students' points from pretest and difference of arithmetic average of an unrelated t test and experiment were used. For comparing control group's last test and performance test ; Anova test statistics was applied. To determine the meaningful distinction after Anova test, Benforroni test was applied. In the research; the significance level was .05 In the pre-test results before the beginning of application no-meaningful distinction was found between experiment and control group according to t test. After the application ; in the last test and permanence test, multiple intelligence method which was applied on experiment group has a meaningful distinction compared to traditional education method applied on control group.

Key Words: Multiple Intelligence Theory, Enzymes, Knowledge Retention, Biology Training.

INRODUCTION

Today, what can an individual do is more widely thought than what he does with the advances in the field of education and psychology. Multiple intelligence theory has been proposed to consider new training methods for his purpose. (Kirk, 2003).After reviewing traditional intelligence approach, Neuropsychology and development expert Gardner proposed for the first time seven different universal capacity in his book '' Frames Of Mind'' which was published in 1983 (Lash, 2004).In 1983, Gardner set forth that any individual has a variety of intelligence degree (mathematical-logical, verbal-linguistic, musical-rhythmic, bodily-kinesthetic, intrapersonal, social, visual-spatial and nature); and this revealed multiple intelligence theory which describes the learning styles, interests, capabilities and tendencies of individuals. (Işık, 2007).Howard Gardner initially prepared a list of seven types of intelligence. The first two of these are verbal- mathematical intelligence which are very precious at school, the next three (musical-rhythmic, bodily-kinesthetic, visual-spatial) are

27

related to the artistic skills and the last two (internal, social) have been called as personal intelligence by Gardner (Gardner, 1999). Finally, he added the naturalist intelligence.

Verbal-Linguistic intelligence is a kind of language capacity to achieve an aim and capability to use language learning ability in terms of writing and speaking effectively (Gündeşli, 2006*). Logical mathematical intelligence* is a capability type for making mathematical calculation, deductive and inductive reasoning, building logical relationships, generating hypothesis, solving problem, making critical thinking and understanding numbers, geometric shapes and abstract symbols. (Vural, 2004). *Visual spatial intelligence* is an ability type for spatial representation of individual mind or shaping dreams , thinking with pictures, images, shapes and lines, perceiving and comprehending three dimensional objects (Büyüksalan, 2003; Gardner, 2006). *Musical-rhythmic* **intelligence** is instrument playing, singing and song writing ability with the basic components of music (melody, rhythm, tempo, freedom, harmony and music forms etc.) Recognition and use of rhythmic and tonal concepts include sensivity capabilities toward sounds from the environment and music instrument (Büyükalan 2003; Çuhadar,2006). *Bodily kinesthetic intelligence* is the capacity of expressing oneself with movements, gestures and facial expressions, using the effective coordination of brain and body , creating a product using the whole body or a part of the whole body (Büyükalan, 2003; Gardner, 2006). *Interpersonal (social) intelligence* is the capacity of understanding, distinguishing and welcoming the emotions, aspirations and needs of surrounding people (Tan, 2008). *Intrapersonal intelligence*, according to Gardner, is the most important intelligence type of daily life, which enables oneself to have knowledge and take responsibility of his own life (Demirel, 2000). *Naturalistic intelligence* is the ability of recognizing and researching all living things in nature and thinking on their creation (MEB, 2009).

Gardner mentioned two important advantages of multiple intelligence in education. They are:
➢ It gives the opportunity to plan our education program so as to make the students desired. (For example, musician and scientific training)
➢ It enables us to reach more students trying to learn different disciplines and theories. Learning would be realized much easily on condition that students are trained by using these intelligence fields (Bümen, 2004).

The two learning disciplines which multiple intelligence theory has put over the top are learning by doing and experiencing and the discipline of organizing teaching status according to students' capabilities (Tan, 2006). While Gardner was submitting the features related to multiple intelligence theory and scientific evidences, he largely relied on brain research and neuropsychology. Thus, the theory has been accepted unquestionably great. Brain research has shown that each intelligence type takes place only in a specific part of the brain (Selçuk, Kayılı, Okut, 2003). Multiple intelligence theory puts forward that every human being has one or more mental space unique to himself and he learns more easily in accordance with this mental space. This theory is considered to enable different learning environments to access information, to have an impact on endearing the subject and to arouse interest. Multiple intelligence theory based teaching in science courses have a great role in creating active learning environment for students. The main principle of multiple intelligence theory is to cater to different intelligence area of each student. To ensure that students are able to create links among the information adopted, it is required to use teaching methods and techniques toward multiple intelligence theory.

It is required to organize learning environment in an encouraging style as students' participation, success, and knowledge internalizing are expected. Depending on this fact, it is quite important to apply multiple intelligence theory in science and technology teaching (Evrekli, Aydın, Balım, 2006).

28

The greatest impact of the theory in the process of teaching is to increase the creativity of teachers in developing teaching strategies. Because, when teachers and planners think activities for each intelligence type, they inevitably enlarge their method and technique repertoire, reveal different and original techniques. As different intelligence types are used in classroom activities during that process, cooperation is possible between the teachers whose expertise areas are completely different from each other. For example, one needs to communicate and get advice of music teacher while planning an activity related to musical intelligence (Demirel, 2000).

Every child has strong and weak sides no matter what his intelligence area is. On condition that only one or two of these intelligence areas are used, the students whose intelligence types don't take place among the ones used at school cannot be able to improve their brilliant sides, complete learning in a long period without enjoying or never manage to learn.

Consulting the relevant literature, it is possible to come across with several research which emphasize determining intelligence types and the impact of a subject discussed according to multiple intelligence theory on student success, knowledge permanence and attitude (Dilek Sezer, 2008; Etli, 2007; Furnham, Sahahidi and Baluch 2002, Güney, 2007; Gök Altun, 2006; Hoerr 1994; Ribot, 2004; Shore, 2004).

In this study, the subject of enzymes of biology course was submitted to students with teaching techniques planned according to multiple intelligence theory, and determining the impact of this study on student success was aimed. Depending on the purpose, answers to the following sub-problems were tried to be found.
1. Is there a meaningful difference between pretest points of experiment group to whom the subject of enzymes was taught according to multiple intelligence theory and control group to whom the same subject was discussed according to traditional methods?
2. Is there a meaningful difference between pretest-posttest points and permanence test points of experiment group to whom subject of enzymes was taught according to multiple intelligence theory?
3. Is there a meaningful difference between pretest- posttest points and permanence test points of control group to whom the subject enzymes was taught according to traditional methods?

METHOD

Research Model
In this study, nonequivalent groups pretest posttest model was used in the scope of quasi experimental method based on neutral determination of groups so as to research the effect of multiple intelligence theory based activities. (McMillan and Schumacher, 2006).

In nonequivalent groups pretest posttest model, there are two groups formed by neutral assigning. One of them is referred as experimental group an the other is called as control group. In each group, pretest and posttest measurements are performed. (Karasar, 2008).

Universe and Sample
The study was carried with 60 teacher candidates of third grade students of Science Teaching department, at which enzymes were studied in the scope of Science Teaching as a part of curriculum. In the study, two classes were used as control and experimental group formed by neutral assigning.

29

Data Collection Tool

Success Test

Success test was developed in the research to measure to what extent the students gained behaviors as long as in the issue of enzymes is concerned. In the success test, 35 questions were prepared for each unit covering any behavior aimed to be taught. The questions were examined by biology and education sciences experts. The test was applied to 86 people who studied the subject of enzymes at university level. At the end of pilot application, selectivity indexes of test articles, article severity degree and Croncbah Alpha reliability coefficient were found and on this basis, the articles whose assessment were weak were taken out of the test. There are 30 questions in the end of the test. General reliability coefficient assessed for success test is $\alpha=.80$.The statement that depending on Alpha coefficient, the scale is highly reliable is used. According to Kalaycı (2008), on condition that Alpha record is between 0.80-1.00, the scale is highly reliable. Besides, there are questions related to five of Bloom's cognitive scale (knowledge, understanding, application, analysis and assessment).

Application

The application was practiced during 2010-2011 education year at the department of Science Teaching of Kafkas University on 60 students attending third grade. During application period, the courses were discussed with traditional method on control group while it was studied according to multiple intelligence theory on experimental group by the researcher. Activities were organized for each intelligence area. The activities are shown below.

Table 1: The table of activities in the issue of enzymes based on multiple intelligence theory.

Intelligence Area	Activity
Verbal Linguistic Intelligence	Writing and reading studies, enabling students to make comments.
Logical Mathematical Intelligence	Problem solving, conducting an experiment, puzzle solving.
Visiual Intelligence Area	Visual Presentations , Materials, Power Point
Musical Intelligence Area	Making Power Point Presentation in company with Enzymes Music.
Bodily- Kinesthetic Intelligence Area	Making animations with body.
Social Intelligence	Knowledge exchange, Cooperated workshops, Group Discussing
Nature Intelligence	Answering the question of what would happen if there were no enzymes? Explaining where the enzymes are used.
Intrapersonal Intelligence Area	Realizing the importance of enzymes for all living creatures and searching for answers to the question of 'why' in the experiments.

For both control and experimental group, pretest at the beginning of the unit, posttest at the end of the unit and retention test after 4 weeks were applied. For the purpose of comparing student success points, these tests consist of same questions.

Data Analysis

In this research, an unrelated t-test in order to compare the students' scores obtained from pre-test and retention tests, and one-way Anova statistics in order to compare the groups within themselves and with one another for repetitive measurements have been applied. The Tukey test has been performed so as to determine among which groups the significant differences have been observed as a result of the Anova test.

FINDINGS AND INTERPRETATION

Evidence of the First Sub-Problem

The first sub-problem of the study is in the form of, "Is there any significant difference between the pre-test score averages of experimental group in which the issue of enzymes is discussed based on the multiple intelligence theory and of the control group in which the same issue is discussed through traditional methods?" In order to assess this sub-problem, a t-test has been performed between the pre-test scores of the students belong to control and experimental groups which have been applied at the beginning of the unit. Results are shown in Table 2.

Table 2: The t-test chart of the scores obtained from achievement pre-test.

Test	Groups	N	Average	S	sd	t	p
Pre-test	Control	30	10.86	1.19	58	.56	.57
	Experimental	30	11.10	1.93			

As a result of the t-test, there is no significant difference between the achievement pre-test scores of the experimental group receiving Multiple Intelligences Theory-based education and of the students of the control group receiving a traditional education, which have been performed before the unit begins [$t_{(58)}$=56, p>.05; Levene Statistics=2.06, p=.15]. The levels of the two groups are consentaneous. This situation has facilitated the implementation of the achievement test to both of the groups in terms of the perception of differences as a result of the practices. It can be said that there is no disparity of success between the students of control and experimental groups in the sense of the issue of enzymes before the implementation.

Evidence of the Second Sub-Problem

The second sub-problem of the research is, "Is there any significant difference between the mean scores of pre-test, pro-test and retention test of the experimental group that discuss the issue of enzymes using the theory of Multiple Intelligences?" The table concerning the ANOVA statistics so as to determine whether there is significant difference between these tests is given below.

Table 3: One-way ANOVA test table for repetitive measures concerning the experimental group students' pre-test, post-test and retention test scores

Source of Variance	Total of squares	sd	Average of squares	F	P*	Significant Difference**
Among subjects	449,789	29	15,510	16,802	.000	2-1,3-1
Measurement	622,156	2	311,078			
Error	1073,844	58	18,515			
Total	**2145,789**	**89**				

* Important at p <.05 level.
** Measurements in which differences have been observed as a result of Tukey test.

According to Table 3, there is a significant difference between the scores of the experimental group in pre-test (1), pro-test (2) and retention test (3) [$F_{(2,58)}$= 16.802, p<0.05]. As a result of the Tukey test, a statistically significant difference has been observed between the pre-test - pro-test and pre-test - retention test of the experimental group (p <0.05).

Table 4: The arithmetic mean and standard deviations of the experimental group students' pre-test, post-test and retention test

Tests	N	Average	SS
Pre-test	30	11.10	1.93
Pro-test	30	16.86	4.96
Retention Test	30	16.46	4.91

In Table 4, it can be seen that the experimental group students' mean score of post-test (x = 16.86) and the mean score of retention test (x = 16:46), are higher than the mean score of pre-test (x = 10.11). In addition, no difference has been observed between the post-test and retention test according to the Tukey test. In this case, when the averages are taken into consideration, the post-test scores of students have increased compared to the pre-test scores; therefore, it can be said that the students have learned the subject of enzymes being discussed according to the Multiple Intelligence Theory. It has been observed that the success levels after the implementation have not changed in accordance with the scores obtained from the retention test, so it can be said that the effect of the implementations based on Multiple Intelligence Theory continues.

Evidence of the Third Sub-Problem and Interpretation
The third sub-problem of the research is: "Is there any significant difference between the pre-test and pro-test - retention test mean scores of the control group that discuss the issue of enzymes using the theory of Multiple Intelligences?" The table concerning The ANOVA statistics so as to determine whether there is significant difference between these tests is given below.

Table 5: ANOVA test chart concerning the control group students' pre-test, post-test and retention test scores

Source of Variance	Total of squares	sd	Average of squares	F	P*	Significant Difference**
Among subjects	254,233	29	8,767	5,658	.000	2-1
Measurement	56,267	2	28,133			
Error	288,400	58	4,972			
Total	**598,900**	**89**				

* Important at P <.05 level.
** Measurements in which differences have been observed as a result of Tukey test.

According to Table 5, there is a significant difference between the scores of the groups in pre-test (1), pro-test (2) and retention test (3) [F $_{(2,58)}$= 5,658, p<0.05]. As a result of the Tukey test, it has been observed that this difference takes part between the control group students' pre-test scores and post-test scores (p <0.05).

Table 6: The arithmetic mean and standard deviations of the control group students' pre-test, post-test and retention test

Tests	N	Average	SS
Pre-test	30	10.76	1.04
Pro-test	30	12.70	3.60
Retention Test	30	11.63	2.15

In Table 6, it can be seen that the control group students' mean score of post-test (x = 12.70) is higher than the mean score of retention test (x = 11.63), and the mean score of pre-test (x = 10.76). In addition, no difference has been observed between the pre-test and retention test according to the Tukey test (p>0.05). In this case, considering the mean scores, it is observed that this difference is in favor of the pro-test. So, it can be said that

32

the students have learned the unit with a traditional method with which they are familiar. There is a significant difference between pro-test and retention test. Considering the averages, it is again observed that this difference is in favor of the pro-test. In this case, it can be said that the students do not remember any information regarding the protein synthesis unit. In the face of the averages, the pro-test scores of the students have increased compared to the pre-test; therefore, students can be said to have learned the subject of the enzymes discussed according to the traditional approach. However, there is not any difference between the scores of the retention test performed after the traditional approach and the scores of the pre-test performed at the beginning; for this reason, there has been detected no retention of information about the subject of enzymes which has been discussed according to the traditional approach.

CONCLUSION AND DISCUSSION

The purpose of this study is to determine the effect of the enzymes issue discussed through the theory of Multiple Intelligences to the success of students. For this purpose, considering the final achievement test scores performed immediately after the subject of enzymes discussed with activities based on the traditional approach and on the theory of Multiple Intelligences; it can be observed that the mean success scores of both of the student groups have increased compared to the pre-test. However, it is seen that this increase has been higher in the experimental group in which activities based on the theory of multiple intelligences have been held. In this respect, the theory of Multiple Intelligences can be said to be effective in learning Bayrak, 2005; Demiral, 2006; Deveci, 2008; Gökçek, 2007; Şengül, 2007; Yağcı, 2006 obtained similar results in their studies.

In the retention test conducted after 3 weeks from the date of the research, it has been determined that there is a significant difference between the experimental group that taught according to the multiple intelligences theory and the control group which taught according to the traditional method; and this difference has been found to be in favor of the experimental group. The research findings demonstrate that the education based on the theory of multiple intelligences affect the permanence of information more positively than traditional methods of teaching. This result obtained from the retention test is in line with the studies of Altuntaş, 2007; Etli, 2007; Öner 2005; Uçak, 2006.

In order for the multiple intelligence-based education to be more effective, education implementations based on multiple intelligence are performed in field education courses in universities' faculties of education, and prospective teachers can implement the multiple intelligence theory more effectively if the studies on this theory are examined.

Teachers should have knowledge about the education based on Multiple Intelligences theory in order for them to identify the intelligence profile of the students having difficulty in comprehending the subject and to prepare appropriate activities for these profiles. If teachers have insufficient knowledge about the subject, they can be informed about multiple intelligences-based instruction through in-service training.

It is thought that students can be academically more successful through education based on Multiple Intelligences Theory in which they can be more effective, use the materials by themselves, speak and discuss freely, learn by seeing and acting, and use their undiscovered intelligence fields. For this reason, in our era where individual differences come into prominence, more importance should be attached to the theory of Multiple Intelligences that can support the students' individuality, and by doing so that can make learning more pleasant (Hasenekoğlu and Gürbüzoğlu 2009).

Authors Note: This study was taken from a part of a published master thesis.

WJEIS's Note: This article was presented at 4th International Conference on New Trends in Education and Their Implications - ICONTE, 25-27 April, 2013, Antalya-Turkey and was selected for publication for Volume 3 Number 1 of IJONTE 2013 by WCEIS Scientific Committee.

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REFERENCES

Altun, D. G. (2006). "Çoklu Zekâ Kuramına Göre Hazırlanmış Ses Ve Işık Ünitesinin Öğrenci Başarısına, Hatırlama Düzeylerine, Fen Bilgisine Karsı Tutumlarına Ve Öğretmen Ve Öğrenci Görüşlerine Etkisi" Muğla Üniversitesi Fen Bilimleri Enstitüsü İlköğretim Eğitimi Anabilim Dalı (Fen Bilgisi Öğretmenliği), Muğla.

Altuntaş, N. (2007). "Çoklu Zeka Kuramı İle Öğrenmenin 7. Sınıf Öğrencilerinin Matematik Başarılarına Etkisi" Marmara Üniversitesi Eğitim Bilimleri Enstitüsü İlköğretim Ana Bilim Dalı İlköğretim Matematik Öğretmenliği Bilim Dalı, İstanbul.

34

Bayrak,H. (2005)."İlköğretim 8. Sınıf Öğrencilerinin Kimyasal Bağlar Konusundaki Başarılarına,Öğrendikleri Bilgilerin Kalıcılığına, Tutum Ve Algılamalarına Çoklu Zeka Kuramına Dayalı Öğretimin Etkisi", Yüksek Lisans Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü İlköğretim Anabilim Dalı Fen Bilgisi Eğitimi Bilim Dalı, Ankara.

Bümen, N. T. (2004), Okulda Çoklu Zekâ Kuramı, İkinci Baskı, Ankara: PegemA Yayıncılık. Syf 21.

Büyükalan, S.F. (2003). Çoklu Zekâ Kuramı", Eğitim ve Denetim Dergisi, Sayı:1, Ankara.

Çuhadar, C.H. (2006). " Müziksel Zekâ" , Ulusal Müzik Eğitimi Sempozyumu Bildirisi, Pamukkale Ünv. Eğt. Fak. Denizli, 26-28 Nisan.

Demirel, Ö. (2000) ,Planlamadan Uygulamaya Öğretme Sanatı, Pegem A Yayıncılık, Ankara.

Demiral,Ü. (2006). " Fen Bilgisi Öğretiminde Genetik Ünitesinin Kavranmasında Çoklu Zeka Kuramının Öğrenci Başarısına Etkisi" , Yüksek Lisans Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü İlköğretim Anabilim Dalı Fen Bilgisi Eğitimi Bilim Dalı, Ankara.

Deveci. E.(2008). "Öğretim Stillerinin Farklı Zeka Türlerine Sahip 6. Sınıf Öğrencilerinin Fen Ve Teknoloji Ders Başarısı İle İlişkisi", Yüksek Lisans, Abant İzzet Baysal Üniversitesi Sosyal Bilimler Enstitüsü, Bolu.

Dilek, S. (2008). "Yeni Programdaki "Madde Ve Isı" Ünitesine Yönelik Laboratuar Etkinliklerinin Çoklu Zeka Kuramına Göre Yürütülmesi, Yüzüncü Yıl Üniversitesi Fen Bilimleri EnstitüsüOrtaöğretim Fen Ve Matematik Alanları Eğitimi Anabilim Dalı, Yüksek Lisans Tezi, Van.

Etli, C. (2007)."Çoklu Zekâ Kuramına Göre Hazırlanan Öğretim Etkinliklerinin 9. Sınıf Öğrencilerinin Biyoloji Başarılarına Ve Öğrenilen Bilgilerin Kalıcılığına Etkisi", Gazi Üniversitesi Eğitim Bilimleri Enstitüsü Orta Öğretim Fen Ve Matematik Alanları Eğitimi AnabilimDalı Biyoloji Öğretmenliği Bilim Dalı, Yüksek Lisans Tezi, Ankara.

Evrekli, E., Aydın, G. ve Balım, A. G.(2006). " Yapılandırmacı kuram ve çoklu zeka kuramı uygulamalarına ilişkin bir teknik: zihin haritalama." Özel Tevfik Fikret Okulları, İzmir: Eğitimde Çağdaş Yönelimler III "Yapılandırmacılık ve Eğitime Yansımaları Sempozyumu".

Furnham, A., Shahidi, S., Baluch, B., 2002. Sex and Culture Differinces in Perceptions of Estimated Multiple Intelligence for Self adn Family: A British – Iranian Comparison. Journal of Cross Cultural Psychology, 33 (3), 270–285

Gardner, H. (1999). " Intelligence Reframed. Multiple intelligences for the 21st century", New York: Basic Books. 41-43 pages. Useful review of Gardner's theory and discussion of issues and additions.

Gardner, H., 2006. Changing Minds. Harvard Business Scholl Press, 244p, Boston,USA.

Gündeşli F. (206). Çoklu zeka kuramı ve ilköğretim kurumlarının yönetim yapısına potansiyel etkileri. Yayınlanmamış Yüksek Lisans Projesi. Kahramanmaraş Sütçü İmam Üniversitesi, Sosyal Bilimler Enstitüsü, Kamu Yönetimi Anabilim Dalı, Kahramanmaraş.

Hasenekoğlu İ. Ve Gürbüzoğlu G. (2009). Çoklu zeka kuramına dayalı işlenen protein sentezi konusunun öğrencilerin bilgilerindeki kalıcılığına etkisi. Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi, 10(3), 49-59.

Hoerr, T.R., 1994. The Multiple Intelligence Approach to Giftedness. Contemporary Education, 66(1), 32–35.

Lash, M.D. (2004). Multiple Intelligences and the Search for Creative Teaching, *Paths of Learning*, 22, 13 – 15

Işık,D. (2007). Çoklu Zeka Kuramı Destekli Kubaşık Öğrenme Yönteminin İlköğretim 3. Sınıf Öğrencilerinin Matematik Dersindeki Akademik Başarılarına Etkisi Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi (Kefad) Cilt 8, Sayı 1.

Kalaycı, Ş. (2008). SPSS Uygulamalı Çok Değişkenli İstatistik Teknik. Ankara: Asil Yayın Dağıtım Ltd. Şti.

Karasar, N. (2008). "Bilimsel Araştırma Yöntemi" Nobel Yayın Dağıtım, Ankara.

Kirk A. Becker. (2003). History of the Stanford-Binet Intelligence Scales: Content and Psychometrics, Stanford-Binet Intelligence Scales, Fifth Edition Assessment Service Bulletin Number 1.

McMillan, J.H. and Schumacher, S. (2006). Evidence-Based Inquiry. Research in Education. United States of America: Pearson Education

MEB. (2009). Meslekî Eğitim Ve Öğretim Sisteminin Güçlendirilmesi Projesİ. Bilişsel Gelişim. Ankara.

Öner, M. (2005). "Tam Öğrenme Destekli Çoklu Zeka Kuramı Uygulamalarının Fen Bilgisi Dersindeki Erişi, Tutum Ve Kalıcılığa Etkisi", T.C. Dicle Üniversitesi Sosyal Bilimler Enstitüsü Eğitim Bilimleri Eğitimi Anabilim Dalı Eğitim Programları Ve Öğretim Bilim Dalı Yüksek Lisans Tezi, Diyarbakır.

Ribot, N.(2007). My Experience Using the Multiple Intelligences. New Horizons For Learning, http://www.newhorizons.org/trans/international/ribot.htm.

Selçuk, Z., Kayılı, H., Okut, L. (2003). "Çoklu Zeka Uygulamaları", Nobel Yayın Dağıtım, II.Baskı, Ankara.

Shore, JR., 2004. Teacher Education an Multiple Intelligences: A Case Study of Multiple Intelligences and Teacher Efficacy in Two Teacher Preparation Courses. Teachers College Record, 106 (1), 112–139.

Şengül, S. H. (2007). "Çoklu Zeka Kuramı Temelli Öğretimin İlköğretim Altıncı Sınıf Öğrencilerinin Dolaşım Sistemi Başarıları Üzerine Etkisi" ,Yüksek Lisans Tezi, Balıkesir, T.C. Balıkesir Üniversitesi Fen Bilimler Enstitüsü Ortaöğretim Fen Ve Matematik Alanlar Eğitimi Anabilim Dalı.

Tan, U. (2008). "Çoklu Zeka Kuramına Göre 3-6 Yaş Arasındaki Çocukların Yöneldikleri Oyuncakların Mesleki Eğilimleri Belirlemedeki Rolü Ve Bir Model Önerisi" ,Yüksek Lisans Tezi, İstanbul.

Tan, Ş (2006), Öğretimi Planlama ve Değerlendirme,Onuncu Baskı, Ankara: PegemA Syf 82.

Uçak, E. (2006) "Maddenin Sınıflandırılması Ve Dönüsümleri Konusunda Çoklu Zeka Kuramı Destekli Öğretim Yöntemi'nin Öğrenci Başarısı, Tutumu Ve Hatırda Tutma Düzeyine Etkisi", Pamukkale Üniversitesi Fen Bilimleri Enstitüsü, İlköğretim Anabilim Dalı, Yüksek Lisans Tezi, Denizli.

Vural , B.,2004,Öğrenci Merkezli Eğitim ve Çoklu Zekâ, Hayat yayıncılık, İstanbul.

Yağcı, Z., "Çoklu Zeka Kuramının İlköğretim Altıncı Sınıf Fen Bilgisi Öğretiminde Öğrenci Başarısına Etkisi", Yüksek Lisans Tezi, T.C. Balıkesir Üniversitesi Fen Bilimleri Enstitüsü İlköğretim Anabilim Dalı, Balıkesir, 2006.

GENDER AND EXPERIENCE AS PREDICTOR OF
BIOLOGY TEACHERS' EDUCATION PROCESS SELF-EFFICACY PERCEPTION AND
PERCEPTION OF RESPONSIBILITY FROM STUDENT SUCCESS

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ABSTRACT

In this research, it is aimed to examine the relation between biology teachers' "education process self-efficacy perception, perception of responsibility from student success" and "gender and experience". The research has been prepared according to the scanning model. A total of 82 biology teachers participated in the research. In the research, "*Education Process Self-Efficacy Beliefs Scale*" and *"Perception of Responsibility from Student Success Scale"* are used. For the general of the scales the Cronbach Alpha Reliability Coefficients have been found as 0.93 and 0.90. In data analysis, beside descriptive statistics, Pearson Correlation Coefficient is used in the calculation of the relation between the variables; and linear regression analysis is performed to determine the level of prediction of the dependent variables by the independent variables. At the end of the research, the level of biology teachers' education process self-efficacy perception and the level of perception of responsibility from student success have been found as medium. On the other hand, the results of the regression analysis have shown that both gender and experience variables positively and significantly predict education process self-efficacy perception and perception of responsibility from student success. It has been determined that while gender accounts for 11.4% of the total variance in education process self-efficacy perception and 9.1% of the total variance in the perception of responsibility from student success, experience accounts for 13.6% of the total variance in education process self-efficacy perception and 8.7% of the total variance in the perception of responsibility from student success.

Key Words: Self-efficacy perception, self-efficacy perception of education process, the perception of responsibility from the success of student, biology teacher, gender and experience.

INTRODUCTION

Teachers play an indispensable role in teaching-learning activities. In this vein, a great body of research is being conducted on whether teachers' demographic characteristics affect teachers' qualifications. It can be stated

37

that of these variables, gender and experience are the most commonly investigated ones. Considering the literature on teacher education particularly in the last 30-40 years, it is observed that the studies focus most on teachers' qualifications and aim to determine in which variables teachers' qualities differ. Rotter's (1996) theory of locus of control and Bandura's (1977) Social Cognitive theory are among the theories which researchers focus on.

Developed by Rotter (1966), the concept of locus of control is individuals' expectations as to what will happen as a result of their behavior, and the tendency to view the situation based on their abilities, characteristics, and behaviors, or the tendency not to view the outcome due to luck, fate, destiny, or the result of any external force (Dönmez, 1986). In this regard, according to the concept of "Taking responsibility for students' success", which is related to the concept of locus of control and coined by Guskey (1981a), while teachers whose perceptions of teaching efficacy are positive take responsible for students' both success and failure, teachers with low perceptions of teaching efficacy attribute students' failure to external factors. It is possible to state that teachers who take responsibility for their students' success in class and attribute the reasons of failure to the problems in their own teaching-learning activities will have a high level of self-efficacy. The concept of self-efficacy, one of the most commonly investigated issues on teachers' qualifications, is closely related to the concept of taking responsibility for students' success.

One of the most important concepts stressed in Bandura's Social Cognitive Learning Theory is the concept of "*Self-efficacy*" (Bandura, 1977). The concept of self-efficacy is defined as a qualification that plays an effective role in shaping behavior and "individuals' perceptions of themselves in successfully completing necessary activities by planning these activities to achieve specific performance (Bandura, 1977; Zimmerman, 1995). There are many perceptions of self-efficacy in different fields and *Teachers' self-efficacy* is one of these concepts. Teachers' self-efficacy is defined as their perception of their ability to have necessary behavior to conduct their duty successfully (Aston, 1984; Brouwers & Tomic, 2003; Guskey & Passaro, 1994; Tschannen-Moran & Hoy, 2001). Self-efficacy related to teaching process can, on the other hand, be described as their perfections of their ability to have necessary behavior in teaching-learning activities. In this regard, preparations before class, what should be done during class and evaluation process prove to be crucial. Positive relationships are stated to exist between teachers' high levels of self-efficacy and students' high quality behavior (Anthony & Kritsonis, 2007; Sewell & St-George, 2000; Usher & Pajares, 2006; Wollfolk, Rosoff & Hoy, 1990). Accordingly, this process can only be realized through teachers' both high level perceptions of taking responsibility and self-efficacy.

Although there are different studies conducted on teachers' perceptions of taking responsibility for students' success and self-efficacy related to teaching process, to the best knowledge of authors, there is not any study conducted that evaluates both these affective qualifications interacting with each other and investigates them through variables of gender and experiences that are among the demographic characteristics of Biology teachers. Yet, perceptions of taking responsibility for students' success and self-efficacy related to teaching process are closely related issues since, in any case, teachers with high levels of self-efficacy will also act based on their perceptions of taking responsibility for their students' success. Teaching activities are directly related to students' success-failure (Erdle, Murray & Rushton, 1985). Therefore, considering that teachers with high levels of locus of self-control also have high levels of professional efficacy, that they take responsibility for students' success, and that all these have a great effect on many issues such as teachers' in-class behavior, planning and applying teaching, motivation, effective classroom management skills, and ensuring student participation (Adu & Olantundun, 2007; Akiri & Ugborugbo, 2009; Guskey, 1981b; Hoy & Spero, 2005; Woolfolk, Rosoff & Hoy, 1990), it is believed that the investigation of the relationships between these concepts and the results obtained through the participation of Biology teachers that are one of the important science groups of the study will contribute significantly to the literature.

The Aim of the Study

The current study aims to investigate the relationships between Biology teachers' perceptions of both self-efficacies related to teaching process and taking responsibility for students' success, and gender and experiences. In this vein, the following research questions were investigated:

1. What are Biology teachers' perceptions of self-efficacy related to teaching process?
2. What are Biology teachers' perceptions of taking responsibility for students' success?
3. Is there a relationship between Biology teachers' perceptions of self-efficacy and taking responsibility for students' success considering their gender and experience?
4. Do Biology teachers' gender and experience predict their perceptions of self-efficacy related to teaching process?
5. Do Biology teachers' gender and experience predict their perceptions of taking responsibility for students' success?

METHODOLOGY

Descriptive survey model was used in the study. The survey model is a research approach that aims to describe, picture, or explain any current or past situations, groups, objects and features as they are (Ekiz, 2003; Karasar, 2006).

Participants

The participants were 82 Biology teachers working in the central districts of Ankara during the second semester of 2011-2012 academic year. These teachers volunteered to participate in the activity.

Data Collection Instrument

The *Scale of Teacher Candidates' Self-Efficacy Beliefs of Teaching Process* and the *Scale of Teachers' Perceptions of Responsibility for Students' Success* were used as the data collection instruments. In this regards, the properties of the scales are as follows:

The *Scale of Teacher Candidates' Self-Efficacy Beliefs of Teaching Process:* The scale was developed by Özdemir (2008). The scale is composed of 3 dimensions: Planning teaching process (8 items), application (19 items) and evaluation (13 items). The scale includes 40 items based on 5-point Likert style. The expected responses are scaled as 1 "totally disagree", 2 "disagree", 3 "neutral", 4 "agree", and 5 "totally agree" (Özdemir, 2008). In the current study, for the whole of the scale Cronbach Alpha Reliability Coefficient was determined as .930, for the dimension of planning teaching process as .814, for the dimension of application as .821, and for the evaluation as .789.

The Scale of Teachers' Beliefs of Responsibility for Students' Success: The scale adapted into Turkish by Ekici (2012a) was originally developed by Guskey (1981a). The scale includes two sub-dimensions, namely, responsibility for success and responsibility for failure. The scale includes 30 items. Two options are provided as (a) and (b) related to both dimensions in each item. The total score that can be obtained from both options in each item can be 100 at maximum. Therefore, in this context, while an option of a dimension is given 99 points, the option of the other dimension can be given 1 point at most. While Cronbach's Alpha reliability coefficient was determined .900 for the overall scare, for the dimension of responsibility for success, it was determined as .814 and for the dimension of responsibility for failure, as .856.

Data Analysis

In addition to the descriptive statistics used in data analysis in line with the aims of the study, Pearson correlation coefficient was used to calculate the relationships between the variables and simple linear regression analysis was calculated to determine the levels of independent variables at predicting depending variables.

39

FINDINGS

In this section, the findings obtained in line with the sub-aims of the study are presented in tables.

The descriptive statistics on Biology teachers' self-efficacy related to teaching process and their perceptions of responsibility for students' success are provided in Table 1.

Table 1: Biology Teachers' Score Distribution in Their Perceptions of Self-Efficacy Related to Teaching Process and Their Perceptions of Responsibility for Students' Success

The dimensions of the scales	N	Mean	SD
The overall consideration of the scale of self-efficacy	82	112.41	11.13
Planning teaching process	82	23.34	2.85
Applying teaching process	82	49.11	6.45
Evaluating teaching process	82	37.42	4.36
The overall consideration of the scale of responsibility for students' success	82	52.71	6.24
The perception of responsibility for students' success	82	46.12	9.45
The perception of responsibility for students' failure	82	44.15	7.23

As Table 1 indicates, Biology teachers' scores in perceptions of self-efficacy related to teaching process is found to be X=112.41 in the overall consideration of the scale. This score is at a moderate level considering that the maximum score that can be obtained on the scale is X=200.00 It is also determined that Biology teachers' scores in perceptions of self-efficacy related to teaching process are at moderate levels in the dimensions of the scale.

Furthermore, in Table 1, Biology teachers' scores in perceptions of responsibility for students' success is found to be X=52.71 in the overall consideration of the scale. This score is close to 50.00, the average of the scale. Therefore, it was determined that Biology teachers' scores in perceptions of responsibility for students' success were close to the overall average of the scale and the scores in perceptions of responsibility for students' failure and success were found to be at moderate levels. Furthermore, the scores in the perceptions of responsibility for success were determined to be higher than those in the perceptions of responsibility for failure.

The findings on the relationship between Biology teachers' perceptions of self-efficacy and taking responsibility for students' success considering their gender and experience

Table 2: Pearson Correlation Coefficient Test Results between Biology Teachers' Perceptions of Self-efficacy and Taking Responsibility for Students' Success Considering Their Gender and Experience

The dimensions of the scales	Gender	Experience
The overall consideration of the scale of self-efficacy related to teaching process	.427*	.718**
The dimension of planning teaching process		
The dimension of applying teaching process		
The dimension of evaluating teaching process	.273*	
The overall consideration of the scale of responsibility for students' success	.709**	.743**
The dimension of perception of responsibility for students' success	.487*	.478*
The dimension of perception of responsibility for students' failure	.516*	.326**

* $p<0.05$ and **$p< 0.01$

Correlation coefficient is calculated to find and interpret the degree of relationship between two variables. The absolute value of correlation coefficient between 0.70-1.00 can be defined as high; between 0.70-0.30 as medium, and between 0.30-0.00 low level relationships (Büyüköztürk, 2002).

As can be seen in Table 2, low and moderate levels of positive relationships were determined between Biology teachers' gender and the overall consideration and the dimensions of the scale of self-efficacy perceptions related to teaching process (r= .273 and r=.427, p< 0.05). On the other hand, moderate and high levels of positive relationships were determined between Biology teachers' gender and the overall consideration and the dimensions of the scale of responsibility perceptions for students' success(r= .487, r= .516 and r=.709, p< 0.05 and p< 0.01).

A high level of positive relationship was determined between Biology teachers' experience and the overall consideration of the scale of self-efficacy perceptions related to teaching process(r= .718, p< 0.01). On the other hand, moderate and high levels of relationships were determined between Biology teachers' experience and the overall consideration and the dimensions of the scale of responsibility perceptions for students' success (r= .326, r= .478 and r=.743, p< 0.05 and p< 0.01).

The findings on Biology teachers' perceptions of self-efficacy related to teaching process as predicted by variables of gender and experience

Table 3: The Results of Simple Linear Regression Analysis Conducted on Predicting Self-Efficacy Perceptions Related to Teaching Process Based on Gender

Variables	B	Standard Error	β	t	p
Constant	6.752	2.235		3.325	.000
Gender	-.365	.785	.074	-2.258	.023

F=1.235, p <0.01, R=.162, R^2 = .114

Considering Table 3, it is seen that of the variables in the study, gender provides a significant relationship with the perceptions of self-efficacy related to teaching process (R=.162, p<0.01). This finding is found to indicate those teachers' gender accounts for 11.4% of the total variance in teachers' perceptions of self-efficacy related to teaching process.

Table 4: The Results of Simple Linear Regression Analysis Conducted on Predicting Self-Efficacy Perceptions Related to Teaching Process Based on Experience

Variables	B	Standard Error	β	t	p
Constant	8.541	2.524		2.245	.000
Experience	.157	.324	-.065	-.452	.001

F=2.154, p <0.01, R=.247, R^2 = .136

Considering Table 4, it is seen that of the variables in the study, experience provides a significant relationship with the perceptions of self-efficacy related to teaching process (R=.247, p<0.01). This finding is found to indicate those teachers' experience accounts for 13.6 % of the total variance in teachers' perceptions of self-efficacy related to teaching process.

The findings on Biology teachers' perceptions of responsibility for students' success as predicted by variables of gender and experience

Table 5: The Results of Simple Linear Regression Analysis Conducted on Predicting Perceptions of Responsibility for Students' Success Related to Teaching Process Based on Gender

Variables	B	Standard Error	β	t	p
Constant	5.758	2.035		1.524	.000
Gender	.658	.751	.365	1.004	.007

F=3.462, p <0.01 - R=.632, R^2 = .091

Considering Table 5, it is seen that of the variables in the study, gender provides a significant relationship with the perceptions of responsibility for students' success (R=.632, p<0.01). This finding is found to indicate those teachers' gender accounts for 9.1% of the total variance in teachers' perceptions of self-efficacy related to teaching process.

Table 6: The Results of Simple Linear Regression Analysis Conducted on Predicting Perceptions of Responsibility for Students' Success Related to Teaching Process Based on Experience

Variables	B	Standard Error	β	t	p
Constant	7.211	2.574		1.862	.000
Experience	.568	.841	.850	1.421	.031

F=1.254, p <0.01, R=.758, R^2 = .087

Considering Table 6, it is seen that of the variables in the study, gender provides a significant relationship with the perceptions of responsibility for students' success (R=.758, p<0.01). This finding is found to indicate those teachers' experience accounts for 13.6 % of the total variance in teachers' perceptions of self-efficacy related to teaching process.

DISCUSSION AND CONCLUSION

The current study conducted to investigate the relationships between Biology teachers' perceptions of both self-efficacy related to teaching process and taking responsibility for students' success, and gender and experiences provides results obtained through conducting appropriate statistical analyses in line with the sub-aims. In this vein, Biology teachers' levels of perceptions of self-efficacy related to teaching process and perceptions of responsibility for students' success were found to be moderate. Their levels of perceptions of self-efficacy related to teaching process were found to be high in some depending on the quality of their work (Çoklar & Odabaşı, 2009; Gökmen, Ekici, Çimen & Altunsoy, 2011; Oğuz, 2009; Özdemir, 2008). On the other hand, considering the related literature, teacher candidates were found to take more responsibility for success than failure (Ekici, 2012a; Ekici, 2012b; Guskey, 1987; Güvenç, 2011; Pratt, 1985; Sherman & Giles, 1981). Moreover, according to the results obtained through the current study, Biology teachers were found to take more responsibility for success than failure. Accordingly, this results obtained from the study prove similar to those of the studies in the related literature. On the other hand, in other studies conducted, it is stated that the education provided to teachers/teacher candidates are effective in their adopting positive perceptions of taking responsibility for students' success and failure (Castellini, 1986; Guskey, 1984; Rosenshine, 1986). In this regard, it is possible to help Biology teachers adopt more positive perceptions of taking responsibility for students' success and failure through future in-service training.

Through another result obtained, low and moderate levels of positive relationships were determined between Biology teachers' gender and the overall consideration and the dimensions of the scale of self-efficacy related to teaching process. This finding can be interpreted as the indication that Biology teachers' perceptions of self-efficacy related to teaching process do not differ much based on the gender variable. Although there are various studies conducted to determine how perceptions of self-efficacy related to teaching process based on gender (Çoklar & Odabaşı, 2009; Özdemir, 2008), there is not any study that investigates the correlation and that is similar to the current study.

One of the important results is that moderate and high levels of positive relationships were determined between Biology teachers' gender and the overall consideration and the dimensions of the scale of responsibility perceptions for students' success. In the related literature review, while Güvenç (2011), Guskey (1981a) and Pratt (1985) investigate whether perceptions of responsibility for students' success differ based on gender, there is not any study conducted to investigate the level of correlation between gender and perceptions of responsibility for students' success and failure. Accordingly, these results will contribute significantly to the literature.

On the other hand, while a high level of positive relationship was determined between Biology teachers' experience and the overall consideration of the scale of perceptions of self-efficacy related to teaching process, moderate and high levels of relationships were determined between Biology teachers' experience and the overall consideration and the dimensions of the responsibility perceptions for students' success. Regarding the high level of relationship between teachers' experience and students' success (Evans, 1992; Gibbons, Kimmel & O'Shea, 1997), if it is thought that experienced teachers will take more responsibility for students' success and failure, the results obtained from this study prove similar to those in the related literature.

The results of the regression analyses put forward that the variables of both gender and experience predict positively and significantly the perceptions of self-efficacy related to teaching process and the perceptions of responsibility for students' success. While it was determined that gender accounted for 11.4% of the total variance in the perceptions of self-efficacy related to teaching process and 9.1% of the total variance in the perceptions of responsibility for students success, experience was found to account for 13.6% of the total variance in the perceptions of self-efficacy related to teaching and 8.7% of the total variance in the perceptions of responsibility for students' success. As indicated in these results, gender and experience are among the important variables that predict both the perceptions of self-efficacy related to teaching process and the perceptions of responsibility for students' success.

Consequently, the fact that Biology teachers have high levels of perceptions of self-efficacy and responsibility can be interpreted as just a few of the important factors considering that they can be quality teachers. However, many factors may affect one another while becoming a quality teacher. Perceptions of self-efficacy and responsibility are among the important factors that affect each other. In the studies conducted in line with this, it is stated that teachers with high levels of perceptions of self-efficacy and professional responsibility are more successful in and ambitious for issues such as choosing appropriate teaching techniques, ensuring higher students' success, effective communication with students (Anderson, Dragsted, Evans & Sorensen, 2004; Appleton & Kindt, 2002; Guskey, 1988). Accordingly, the fact that teachers have high levels of perceptions of self-efficacy related to teaching process and responsibility indicates that there might be more successful students during teaching and learning process and quality individuals who have sufficient biological knowledge and can apply this knowledge in their daily lives in the society. In this regard, Biology teachers lack in related issues can be compensated through in-service training activities.

IJONTE's Note: This article was presented at 4th International Conference on New Trends in Education and Their Implications - ICONTE, 25-27 April, 2013, Antalya-Turkey and was selected for publication for Volume 4 Number 2 of IJONTE 2013 by IJONTE Scientific Committee.

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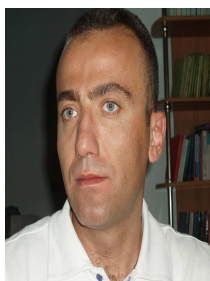
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REFERENCES

Adu, E. O., & Olantundun, S.O. (2007).Teachers' Perception of Teaching as Correlates Students' Academic Performance in Oyo State Nigeria. *Essays in Education,* 20, 57–63.

Akiri, A. A., & Ugborugbo, N. M. (2009).Teachers' Effectiveness and Students' Academic Performance in Public Secondary Schools in Delta State, Nigeria. *Stud Home Comm Sci,* 3 (2), 107–113.

Anderson, A. M., Dragsted, S., Evans, R. H., & Sorensen, H. (2004). The relationship between changes in teachers' self-efficacy beliefs and the science teaching environment of Danish first-year elementary teachers. *Journal of Science Teacher Education, 15*, 25-38.

Anthony, T., & Kritsonis, W. (2007). A mixed methods assessment of the effectiveness of strategic e-mentoring in improving the self-efficacy and persistence (or retention) of alternatively certified novice teachers within an inner city school. *District Doctoral Forum National Journal for Publishing and Monitoring Doctoral Student Research,* 4 (1), 1-8.

Appleton, K., & Kindt, I. (2002). Beginning elementary teachers' development as teachers of science. *Journal of Science Teacher Education, 21*, 155-168.

Aston, P.T. (1984). Teacher efficacy: A motivational paradigm for effective teacher education. *Journal of Teacher Education*, 35 (5), 28-32.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191-215.

Bandura, A. (1997). *Self- efficacy: The exercise of control.* New York: Freeman.

Brouwers, A. & Tomic, W. (2003).A test of the factorial validity of the teacher efficacy scale. *Research in Education,* 69, 67–80.

Büyüköztürk, Ş. (2002). *Handbook of data analysis for the social sciences.* Ankara: Pegem-A Publishing.

45

Castellini, C. A. (1986). *An analysis of the effects of effective teaching training on elementary teachers' locus-of-control* (Doctoral Dissertation, Pennsylvania State University, 1986), Dissertation Abstracts International, 47, 3960.

Çoklar, A. N. ve Odabaşı, H. F. (2009). Educational technology standards for teachers in terms of the ethical issues of measurement and evaluation of self-determination. *Ahmet Kelesoglu Education Faculty (AKEF) Journal,* 27, 1-16.

Dönmez, A. (1986). Locus of control: Basic research areas. *Ankara University, Journal of Faculty of Educational Sciencs,* 18 (1), 259–280.

Ekici, G. (2012a). Responsibility perception scale of teachers' for student achievement: The adaptation into Turkish, validity and reliability study. *Journal of Contemporary Education Academic,* 1(2), 23–35.

Ekici, G. (2012b). Evaluating the effect of the variables of gender and experience on biology teachers' perceptions of responsibility for students' success. Niğde: X. National Congress of Science and Mathematics Education, 27–30 June 2012.

Ekiz, D., (2003). *Introduction to research methods in education.* Ankara: Ani Publishing.

Erdle, S., Murray, H.G., & Rushton, P. (1985). Personality, classroom behavior and student ratings of college teaching effectiveness: A path analysis. *Journal of Educational Psychology, 77*, 394-406

Evans, B. (1992). Staff effective in schools. *Making Schools more Effective,* 67–68.

Gibbons, S., Kimmel, H., & O'Shea, M. (1997). Changing teacher behavior through staff development: implementing the teaching and content standards in science. *School Science and Mathematics, 97* (6), 302–310.

Gökmen, A., Ekici, G., Çimen, O. ve Altunsoy, S. (2011). An investigation into candidate biology teachers' self-efficacy beliefs related to the teaching process. *World Conference on Educational Sciences,* Istanbul: Bahcesehir University, 3-7 February 2011, *Procedia Social and Behavioral Sciences,* 2 (2011), 2559-2563.

Guskey, T. R. (1981a). Measurement of the responsibility teachers assume for academic successes and failures in the classroom. *Journal of Teacher Education,* 32 (3), 44–51.

Guskey, T. R. (1981b). The Relationship of Affect toward Teaching and Teaching Self-Concept to Responsibility for Student Achievement. *Journal of Social Studies Research,* 5 (2), 60-74.

Guskey, T. R. (1984). The influence of change in change in instructional effectiveness upon the affective characteristics of teachers. *American Educational Research Journal, 21* (2), 245–259.

Guskey, T. R. (1987). Context Variables that Affect Measures of Teacher Efficacy. *Journal of Educational Research,* 81 (1), 41–47.

Guskey, T. R. (1988).Teacher Efficacy, Self-Concept, and Attitudes toward the Implementation of Instructional Innovation. *Teaching and Teacher Education,* 4, 63–69.

Güvenç, H. (2011). Preservice teacher's self efficacy and responsibility for student achievement perceptions. *e-Journal of New World Sciences Academy Educational Sciences,* 6 (2), 1410-1421.

Hoy, A. W., & Spero, R. B. (2005). Changes in Teacher Efficacy During the Early Years of Teaching: A Comparison of Four Measures. Teaching and Teacher Education, 21, 343–356.

Karasar, N. (2006). *Scientific research methods.* Ankara: Nobel Publishing.

46

Oğuz, A. (2009). Evaluating teacher candidates' perceptions of self-efficacy related to teaching process. *International 5th Balkan* Education and Science Congress, pp. 67-70. Edirne: Trakya University Faculty of Education, 1-3 October 2009.

Özdemir, S. M. (2008). An Investigation of Prospective Primary Teachers' Self-Efficacy Beliefs Regarding Teaching Process in Terms of Certain Variables. *Educational Administration: Theory and Practice,* 54, 277–306.

Pratt, D. L. (1985). Responsibility for student success/failure and observed verbal behavior among secondary science and mathematics teachers. *Journal of Research in Science Teaching, 22,* 807–816.

Rosenshine, B. (1986). Synthesis of research on explicit teaching. *Educational Leadership, 43* (7), 60–69.

Rotter, J. B. (1966).Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs*, 80 (1), 1–28.

Sewell, A. & St-George, A. (2000). Developing efficacy beliefs in the classroom. *Journal of Educational Enquiry*, 1 (2), 58-71.

Sherman, T. M., & Giles, M. B. (1981). The development and structure of personal control in teachers. *Journal of Educational Research, 74,* 139–142.

Usher, E., & Pajares, F. (2006). Inviting confidence in school: invitations as critical source of the academic self-efficacy beliefs of entering middle school students. *Emory University Journal of Invitational Theory and Practice,* 12, 7–16.

Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17* (7), 783–805.

Woolfolk, A. E., Rosoff, B., & Hoy, W. K. (1990). Teachers' Sense of Efficacy and Their Beliefs about Managing Students. *Teaching and Teacher Education,* 6, 137–148.

Zimmerman, B. J. (Eds.) (1995). *Self-efficacy and educational development. Self-efficacy in changing societies.* New York: Cambridge University Press.

THE EFFECT OF GENDER AND COMPUTER USE VARIABLES ON RECOGNATION OF GEOMETRICAL SHAPES IN PRESCHOOL CHILDREN

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ABSTRACT

In this study it is aimed to search the geometrical shapes recognition levels of pre-school children. This is a descriptive study which uses screening model. The study group of the study consists of total 192children (60-72 months) chosen from the nursery classes of elementary schools subject to National Educational Ministry in Giresun city centre and from independent nursery schools by "*random sampling*" method. As a data gathering tool, "Recognition of Geometrical Shapes Test", developed by Aslan (2004), was used in the study. Recognition of Geometrical Shapes Test consists of four dimensions as triangle, square, circle and rectangle. The date was analyzed in SPSS for Windows program. Percentage and frequency values are used. As a result of this study it is found out that the recognition level of the geometrical shapes varies in a meaningful way according to gender and computer use at home.

Key Words: Preschool, geometry, gender, computer.

INTRODUCTION

Geometry consists of four basic shapes including triangle, square, circle and rectangle (Clements, 1998; MEB, 2006). Geometry teaching is more important in pre- school period, when first critical geometrical observations are made, instincts develop and concept and information is acquired, than the other periods following it (Develi and Orbay, 2003). The pre-school children have some misconceptions about these four geometrical shapes. The children may develop these misconceptions according to their *location, oblateness, and deformity* (Clements, 1999). Location, oblateness, deformity and size affect the children's classification decisions and as a result of this they cannot make a reliable decision. That is they can recognize the shape when it is in its classical location, however, they cannot recognize the same shape when the location changes (Aslan and Aktas Arnas, 2004). This situation results from the geometrical thinking abilities of the pre- school children. Van Hiele divides geometrical reasoning into five levels and mentions that pre-school children are in *'visual level'* which is the first level. In this level, the children perceive the shapes as a whole and make classifications by comparing the shape with a prototype (Bennie, 1998; Jami and Gutierrez, 1994). According to Van Hiele's theory, geometrical reasoning levels can be improved if individual is supported with education (Van Hiele, 1986). In recent years researches show that appropriate curriculum can improve numerical and geometrical knowledge in pre-school children. Teachers can reinforce children's mathematical thinking by asking questions as 'Have you tried to do it in this way?', 'What would be if it happens?', 'Do you think you can do this?' (Clements, 2001). Clements and colleagues examined the tendencies and styles of preschool children in understanding geometrical shapes. As a result it is defined that 96% of the children could fully recognize circles. Although the children consider equilateral quadrangle as a square, 87 % could fully recognize squares. It is put forth that little children are less

48

successful in recognizing triangles (60%), this level is even lower in rectangles (54%) and children also have the tendency to define parallel edges as rectangle. Another study conducted by Clements and colleagues (1999) concludes that children's rectangle recognition levels are lower than the other shapes. In a study conducted in Turkey by Kesicioglu and colleagues (2011b) similar findings are presented and it is observed that pre-school children made mistakes while recognizing the triangle, square, rectangle and circle shapes and their distractors.

The aim of pre-school education is to support all development fields of a child. Computers are symbols of modern technology. Children need to have early experience with the developing tool (Coskun, 1990). It must be provided that the child learns within the game via computers. Also it is an attractive tool for the child. One way of developing mathematical knowledge is through usage of appropriate technology. The child's interaction with computer leads to positive results while learning geometrical shapes concept (Dwyer, 2002). The child obtains different shapes and results on the screen by using certain keys of the computer. For instance, finding two similar shapes and inserting one shape into another are games for the child; however, he learns to differentiate different geometrical shapes at that moment (Arıcı and Demir, 2009). An activity in Building Blocks software aiming to improve mathematical skills of children enables children to draw pictures by using special tools related to geometry. Via this software, awareness levels of children about geometrical shapes are enhanced (Clements, 2001). In a similar study completed by Kesicioglu (2011a) computer use has important effects on children's learning geometrical shapes, eliminating misconceptions and permanency of the knowledge.

It can be seen that one of the factors affecting mathematical abilities of individuals mentioned in literature reviews is *"gender"*. Gender difference in mathematics is one of the most mentioned issues not only for Turkey but also for other countries and it brought about studies focusing on gender difference (Duru, 2002). Later, the factors influencing the gender difference in mathematical success were studied (Alkhateeb, 2001). According to the researches, socio- cultural factors such as biological differences, abstract thinking differences between genders, attitudes towards mathematics, families' and teachers' expectations from student define the differences (Alkhateeb, 2001; Duru, 2002). However, there are little research on mathematical skills and gender in preschool period (Unutkan, 2007; Guven,2007), there are no studies directly aiming children's geometrical levels. The literature touches upon the necessity to improve pre-school children's geometrical skills. Along with this, since pre-school period is the most critical period for mathematical skills as well as most of the skills and there are not enough researches in Turkey on this field, this study aims to investigate the geometrical skill levels of pre-school children. In order to reach this aim answers to the following sub-problems were sought;

1. Do the recognition levels of geometrical shapes in pre-school children vary meaningfully according to gender?
2. Do the recognition levels of geometrical shapes in pre-school children vary meaningfully according to whether they use computer at home or not?

METHOD
This section consists of research model, study group of the research, data gathering tools, research process and statistical techniques used in data analysis.

Research Model
The research is de descriptive study which uses screening model. Screening model is a research approach aiming to describe a situation as it was or as it still is. Individual or object subject to research is tried to be defined in its conditions and as it is. There is no attempt to change or affect them by any means (Karasar, 2002). In descriptive screening model, answers are sought to the research problem or problems by the analysis of the data gathered from multiple experimental subjects or objects in a period of time (Arseven, 2001).

Study Group

Data gathering tool was applied to 272 (60-72 months) children by the researcher; however, the children *"who have computers at home"* were included to the study group of the research. The study group of the study consists of total 192 children (60-72 months) chosen from the nursery classes of elementary schools subject to National Educational Ministry in Giresun city centre and from independent nursery schools. In simple random sampling, every element forming the universe has the equal chance to be the sample. Therefore, the weight to be given will be the same for every element while calculating (Arıkan, 2004). The children constituting the sample consist of 115 boys and 77 girls.

Data Gathering

Data gathering tool was applied to pre-school children taken into study group in 2012-2013 educational years by the researcher. The scale was applied to the children one by one in order not that they influence each other. Four test were given to the children in order and instructions such as tick the triangle, tick the rectangle, tick the square and tick the circle were given. All children were given the same instruction which enabled the objectivity of the research for all the children. Time for data gathering for each child lasted approximately 30 minutes. As a part of the research, information on whether the child had computer at home or not was gathered from the children's parents. The answers "yes" and "no" to the questions "there is a computer/there are no computers at home" and "my child actively uses computer" were required from the parents.

Data Gathering Tool

In the study, "Recognition of Geometrical Shapes Test" developed by Aslan was used as a data gathering tool. Recognition of Geometrical Shapes Test consists of four dimensions as triangle, square, circle and rectangle. There are totally 12 items in triangle recognition test which are 6 triangle shapes and 6 distractors, 12 items in rectangle recognition test which are 5 rectangle shapes and 7 distractors, 12 items in square recognition test which are 4 square shapes and 8 distractors, 12 items in circle recognition tests which are 5 circle shapes and 7 distractors. The maximum points that can be obtained from each sub dimension is '12' points and it is '0' points at minimum. There are total 48 items. The maximum points that can be obtained from whole test is '48' points and it is '0' points at minimum. In order to determine the validity- reliability of Aslan's (2004) testing tool, each item's strength and differentiating indexes were calculated by considering item and test analysis. It is observed that there is no item below .15 in terms of differentiating and item strength varies between .32 and .99. As a result of the reliability study conducted by Aslan (2004), KR 20 alpha values was defined as .80 for triangle recognition test, .88 for rectangle recognition test, .81 for square recognition test and .77 for circle recognition test. Taking these results into consideration it can be said that this test have enough reliability level to be used. As a result of the reliability test conducted for this research the values were found as .76 for triangle recognition test, .82 for rectangle recognition test, .77 for square recognition test and .71 for circle recognition test.

Data Analysis and Evaluation

The data was analyzed in SPSS for Windows 18 program. Percentage and frenquency values were used. By taking dimensions constituting the scale into consideration while evaluating the data, for the items forming each dimension, these items average point was found and afterwards general average point was obtained. Statistical comparison (t test) was conducted with average points obtained for each sub dimension of the scale. In order to test the meaningfulness of average points obtained from the scale dimensions and the statistical difference according to gender and computer use at home variables, "t test" was used. While evaluating the differences between the groups arithmetic average and meaningfulness values were taken into consideration depending on analysis results (Büyüköztürk, 2006).

FINDINGS

The results of the study completed in order to find out the relationship between geometrical shapes recognition level of pre-school children and gender and computer use variables are presented below.

Findings related to first sub problem: Do the recognition levels of geometrical shapes in pre-school children vary meaningfully according to gender?

Table 1: T test results of geometrical shapes recognition level of pre-school children in terms of gender.

Dimensions	Gender	n	$\overline{x}$	S	Sd	t	P
Triangle	Girl	77	8.87	1.47	190	2.69	.59
	Boy	115	9.52	1.72			
Rectangle	Girl	77	8.18	1.63	190	7.22	.01*
	Boy	115	10.01	1.77			
Square	Girl	77	7.93	1.69	190	4.47	.01*
	Boy	115	9.86	2.05			
Circle	Girl	77	8.68	1.65	190	8.2	.24
	Boy	115	8.93	2.35			
Total	Girl	77	33.66	4.27	190	8.22	.00*
	Boy	115	38.32	5.07			

*$p<0.01$

When Table 1 is analyzed, it can be observed that rectangle and square sub dimensions of the geometrical shapes recognition test in pre-school children and their total points vary meaningfully in statistical terms in gender for boys. Triangle and circle sub dimensions of the geometrical shapes recognition test in pre-school children do not statistically reflect a meaningful variation in terms of gender.

Findings related to second sub problem: Do the recognition levels of geometrical shapes in pre-school children vary meaningfully according to whether they use computer at home or not?

Table 2: T test results of geometrical shapes recognition level of pre-school children in terms of whether they use computer at home or not .

Dimensions	PC use at home	N	Gender		$\bar{x}$	S	Sd	t	P
			Boy	Girl					
Triangle	Yes	139	96	43	8.55	1.44	190	3.90	.00*
	No	53	19	34	7.49	1.76			
Rectangle	Yes	139	96	43	10.90	1.59	190	8.20	.00*
	No	53	19	34	6.66	1.72			
Square	Yes	139	96	43	9.68	1.64	190	7.25	.00*
	No	53	19	34	7.52	2.27			
Circle	Yes	139	96	43	10.06	1.44	190	6.69	.62
	No	53	19	34	10.04	2.69			
Total	Yes	139	96	43	39.20	3.79	190	10.89	.00*
	No	53	19	34	31.73	5.27			

*P<0.01

When Table 2 is analyzed, it can be observed that triangle, rectangle and square sub dimensions of the geometrical shapes recognition test in pre-school children and their total points vary meaningfully in statistical terms in terms of their computer use at home in favor of the children who have a computer at home. Circle sub dimension of the geometrical shapes recognition test in pre-school children does not statistically reflect a meaningful variation in terms of computer use or not.

RESULT AND DISCUSSION

When the findings of the research is analyzed, it can be observed that rectangle and square sub dimensions of the geometrical shapes recognition test in pre-school children and their total points vary meaningfully in statistical terms in terms of gender for children. Beginning from this information it can be concluded that there is a relationship between gender and geometrical shapes recognition test in pre-school children. It can also be observed that there is no statistically meaningful variation in terms of gender in triangle and circle sub dimensions of the geometrical shapes recognition test in pre-school children. There is not any study that deals with geometry skills and gender relationship in pre-school level. Nevertheless, when the studies on older age groups examined, it is seen that there are differences for boys parallel to the findings of this study (Hanna, 1990, Battista, 1990; Knodel, 1997; Ubuz, 1999, Livatidis and et al, 2003). We reach more informative findings when these results and the findings related to the second sub problem are evaluated together. If we consider the number of the children who use computer at home, it can be seen that the of the boys is "96" and girls is "43". It is obviously seen that the boys use computer more at home. When the literature was reviewed, it was found out that boys use computer at home more than girls (Lipinski et al, 1986; Seng, 1997). If the findings of the second sub problem are examined, it is seen that boys geometrical shapes recognition is higher. In this case, it can be said that since boys use more computer, their geometrical shapes recognition levels are in favor

of boys. On the contrary, Unutkan (2007) could not find a meaningful relationship between mathematical skills and genders of the children in pre-school period.

When the research findings are analyzed, it can be observed that triangle, rectangle and square sub dimensions of the geometrical shapes recognition test in pre-school children and their total points vary meaningfully in statistical terms in terms of their computer use at home in favor of the children who have a computer at home. No statistically meaningful variation in terms of computer use was found in circle sub dimension of the geometrical shapes recognition test in pre-school children. When the literature is reviewed, it is defined that children have misconceptions especially about rectangle and triangle shapes and they have the least misconception about circle shape (Clements and et all, 1999; Clements and et all, 2000; Kesicioğlu and et all, 2011b). As a result of this study, there are no meaningful relationships between the children's recognition levels of the circle shape and their computer use at home, which may result from that the children have already known this shape. Again when the literature is taken into consideration, it is seen clearly that their computer use at home has a positive effect on their recognition levels of other geometrical shapes (triangle, square, and rectangle). With reference to this situation, it can be put foth that there is a positive relationship between the computer interaction of the children in pre-school period and their recognition level of geometrical shapes. Moreover, it can be added that computer games and educational software have beneficial effects on children's recognition of shapes (Kesicioglu, 2011a, Clements, 2002, Battista, 2002). This situation brings about the impact of computers on children's geometrical shape concepts; however, it must be considered that there can be other factors can influence the result. If it is considered that the children who have a computer at home have families higher in socio- economical situations than the other children, it can be assumed that the children encounter more stimulants. Many researches put forward that socio- economical level have effects on mathematical skills and; therefore, children with a higher socio- economical level are more successful (Clements et all., 2001; Thompson et all, 2005). Parallel to the findings of this study, Roorda (1994) and Olgun (2003) mention that the stimulants and concrete experiences provided to the child in early childhood affects the child's geometry skills in a positive way. In the literature view it is seen that the computer use of the child at home provides great opportunities for child's learning and teacher- parents cooperation, but parents have some drawbacks about computer use at home (Haughland, 1997). In order to eliminate these drawbacks, the pre-school teacher have some important duties.

SUGGESTIONS

1. As a result of the research, pre-school period children's recognition levels of geometrical shapes statistically differ in a meaningful way in favor of boys. It is suggested to present different variables by conducting further researches defining the causes of this situation.

2. In the conclusion part of the research, it is put forward that pre-school period children's recognition levlef of geometrical shapes differ in a meaningful way in favor of the children who have a computer at home when computer use at home is taken into consideration. It is suggested that factors and variables to affect this situation such as socio- economical level of the child must be studied and the causes of differences in computer use in boys and girls must be explained.

3. It is suggested that the families are given educational seminars about how to provide their children with educational benefits via computer in pre-school period.

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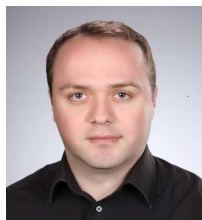
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REFERENCES

Alkhateeb, H.(2001). Gender differences in mathematics achievement among high school students in the united arab emirates, 1991-2000. *School Science and Mathematics*, 101(1): 5-9.

Arıcı, N., Demir., C. (2009). Vocabulary laerning software for kindergarten children.*5th International Advanced Technologies Symposium (IATS'09), 13–15 May 2009, Karabuk, Turkey.*

Arıkan, R. (2004). *Araştırma teknikleri ve rapor hazırlama*. Ankara: Asil Yayın.

Aslan, D., Aktaş Arnas, Y. (2004). The development of geometrical thinking in a three- to six-year-old children's group. *1st International Pre-school Education Conference, 30 Haziran-3 Temmuz 2004, İstanbul*

Battista, M.T.(1990). Spatialvisualization and gender differenees in high school geometry.*Journal for Researeh in Mathematics Education, 21(l): 47-60.*

Battista, M.(2002). Learning geometry in a dynamic computer environment. *Teaching Children Mathematics. 8(6): 333-339.*

Bennie, K. (1998). *An analysis of the geometric understanding of Grade 9 pupils using Fuys et al's interpretation of the Van Hiele theory*. In N.A. Ogude & C. Bohlmann (Eds.), Proceedings of the Sixth Annual Meeting of the Southern African Association for Research in Mathematics Education (pp. 64-69). Pretoria: Universtiy of South Africa.

Büyüköztürk, ş. (2006). *Sosyal bilimler için veri analizi el kitabı (6. Basım)*. Ankara: Pegem A Yayıncılık.

Clements, D. H. (1998). *Geometric and spatial thinking in young children*. Arlington, VA: National Science Foundation.

Clements, D.H. Swaminathan, S., Hannibal, M.A., Sarama, J. (1999). Young children's concepts of shape. *Journal for Research in Mathematics Education*. 30(2):192-212.

54

Clements, D.H., Sarama, J. (2000). Young children's ideas about geometric shapes. *Teaching Children Mathematics*, 6(8): 482-488.

Clements, D. H. (2001). Mathematics in the preschool. *Teaching Children Mathematics*, 7, 270-275.

Clements, D. H. (2002). Computers in early childhood mathematics. *ContemporaryIssues in Early Childhood*, 3 (2):160-181.

Clements, D. H., Sarama, J., Spitler, M. E., Lange, A.A., Wolfe, C.W. (2011). Mathematics learned by young children in an ınvertation based on learning trajectories. A largescale cluster randomized trial. *Journal for Research in Mathematics Education*. 42 (2), pp:127-167.

Coşkun, F. (1990). Anaokuluna giden beş yaş çocuklarının 1'den 5'e kadar sayı sembollerini öğrenmelerinde geleneksel eğitim ile bilgisayar eğitiminin karşılaştırmalı olarak incelenmesi. Hacettepe Üniversitesi Sağlık Bilimleri Enstitüsü (Yayımlanmamış Yüksek Lisans Tezi), Ankara.

Develi, M. Orbay, K.(2003). İlköğretimde niçin ve nasıl bir geometri öğretim. *Milli Eğitim Dergisi, Sayı 157.*

Dwyer, B. (2002). The uses of computer technology in the remediation of children with specific learning ifficulties. *Computer Application In Education*.

Duru, A. (2002*). Research of affect of gender dıfference on mathematıcs achıevement ın fırst of grade high school in Van* (Unpublished master dissertation). Yüzüncü Yıl Üniversity, Van.

Güven, Y. (2007). Inituitional mathematics ability of preschool children. *Oneri, 7 (28), 389-395.*

Hanna, G. (1990). Mathematics achievement of boys and girls: An internationalperspective. *Ontario Mathematies Gazete, 28 (3), 28-32.*

Haughland, S. (1997). Children's home computer use: an opportunity for parent/teacher collaboration. *Early Childhood Education Journal, 25(2):133-135.*

Jami, A., Gutierrez, A. (1994). A model of test design to assess the van hiele levels. *Proceedings of the 18th PME Confence, 3:41-48, Lisboa.*

Kesicioğlu, O.S. (2011a). *An analysis of the impact of an instructional program designed with direct instruction method and of a computer assisted instructional program designed in accordance with this method on preschoolers`geometric figures concepts learning*(Unpublished doctoral dissertation). Gazi Üniversity, Ankara.

Kesicioğlu, O.S., Alisinanoğlu, F., Tuncer, A. T. (2011b). The analysis of kindergarteners` recognition degrees of geometric shapes. *Elementary Education Online, 10(3), 1093-1111.*

Knodel, J., 1997. The closing of the gender gap in scoling the case of Thailand. *Comparative Education, 33(1): 61-86.*

Lipinski, J., Nida, R., Shade, D., Watson, J. (1986). The effect of microcomputers on young children: An examination of free play choices, sex differences, and social interactions. *Journal of Educational Computing Research, 2(2): 147-68.*

55

Livaditis, M., Zaphiriadis, K., Samakouri, M., Tellidou, C. Tzavaras, N., Xenitidis, K., (2003). Gender differences, family and psychological factors affecting school   performance in Greek   secondary   school   students*. Educational Psychology,   23(2), pp. 223-231.*

MEB. (2006). *Milli Eğitim Bakanlığı Okul Öncesi Eğitimi Genel Müdürlüğü. 36–72 aylık   çocuklar için okul öncesi eğitim programı.* Ankara: Millî Eğitim Basımevi.

Olkun, S., Altun, A. (2003). İlköğretim öğrencilerinin bilgisayar deneyimleri ile uzamsal düşünme ve geometri başarıları arasındaki ilişki. *The Turkish Online Journal of   Educational Technology – TOJET   October.   ISSN: 1303-6521, 2 (4), Article 13.*

Roorda, J. (1994). Visual perception, spatial visualization and engineering drawing. *Engineering Design Graphics Journal, 58 (Spring 1994): 12-21.*
Thomson, S., Rowe, K., Underwood, C., Peck, R. (2005). Numeracy in the early years: project good   start. Camberwell, Victoria, Australia: Australian Council for *Educational Research.*

Ubuz, B. (1999). 10. ve 11. sınıf öğrencilerinin temel geometri konularındaki hataları ve kavram   yanılgıları. *Hacettepe University Journal of Education, 16(17), 95 – 104.*

Unutkan Polat, Ö. (2007). A study of pre- school chıldren's school readıness related to skills of mathematics. *Hacettepe Üniversity Journal of Education, 32, 243-254.*

Van Hiele, P. M. (1986). *Structure and insight: A theory of mathematics education*. Orlando, FL:Academic Press.

Yılmaz, S., Turgut, M., Alyeşil Kabakçı, D. (2008). Ortaöğretim öğrencilerinin geometrik düşünme   düzeylerinin incelenmesi: Erdek ve Buca örneği. *Üniversite ve Toplum   Dergisi. 8 (1).*

METACOGNITIVE AWARENESS IN SCIENCE CLASSROOM OF HIGHER SECONDARY STUDENTS

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ABSTRACT

Metacognition is the awareness one has about his/her thinking process and how he/she is able to control these processes. This study aims at examining the effects of inquiry based learning and cooperative learning on metacognitive awareness in science class room. A quasi experimental design involving three groups namely, two treatment groups- inquiry based learning and cooperative learning and control group was adopted. Standardized tool developed by Schraw and Dennision(1994) was used to measure metacognitive awareness in three groups. Results revealed that students in cooperative learning received higher metacognitive awareness compared to other groups. The researchers recommend that cooperative learning be adopted regularly in classroom to enhance metacognitive awareness of higher secondary students.

Key Words: Metacognitive awareness, Metacognition.

INTRODUCTION

Today, one of the main goals of education is to make the students gain the thinking skills and strategies which they will use throughout their lives, rather than storing information. A good education should be able to show the students how to learn, how to remember, how to motivate themselves and how to control their own learning, so that they can teach how to learn. For all these reasons, to investigate the process of the metacognitive skills of students is quite important. Metacognition concept was put forward for the first time in 1976 by John Flavell and developed by many researchers until today. Some descriptions related to the concepts of metacognition made by different researchers are as follows: Flavell (1976) sees metacognition as ''the cognitive processes or outcomes of individuals or the knowledge of anything about them.'' According to Brown (1980) metacognition includes the capabilities such as the estimation of one's own mental activities, planning, monitoring and evaluation. Brown(1987) divides metacognition into two broad categories: Knowledge of cognition and regulation of cognition. Knowledge of cognition refers to activities that involve conscious reflection on one cognitive abilities and activities. Regulation of cognition refers to activities regarding self-regulatory mechanisms during an ongoing attempt to learn.

Shelia(1999) stated that, the fact that metacognition has been linked to increases in the academic achievement of learners at all ability levels is another reason for its use. Ellis(1999), Lippmann(2005) and Coutinbo(2007) in their contributions noted that metacognitive activity engages the student in the learning process and seeks to improve the critical thinking, reasoning, and problem-solving skills of the learner. Coutinbo(2007) again emphasized that as learners, some of who might normally "turn out" or refuse to speak out in a traditional

49

setting, become actively involved in the learning process through metacognition. Ozsoy(2008) noted that every metacognitive strategy, when used appropriately, can enable students to move beyond the text, memorization of basic facts, and learning lower level skills. This method which results in cognitive restructuring leads to an increase in understanding of students.

Apart from academic benefits, metacognitive approach has been found to promote self-esteem, and improved attitudes toward school and peers (Magno,2001). Kramarski et.al (2004) found that different metacognitive strategies can be employed to help low ability students to improve achievement, who had difficulties making success in the traditional classroom. In general, metacognitive strategies can be said to lead to the promotion of critical thinking, reasoning, and problem-solving behaviour (Sheila 1999; Lippman,2005; Coutinbo,2007).

STATEMENT OF THE PROBLEM

It has been observed by the researcher that many students, after learning about science concepts through activities that address the various intelligences and learning styles, still choose not to participate in classroom discussions. Instead a select few students answer teacher generated questions and develop their own questions on the topic while the rest of the students remain mute. Based on the lack of response from the majority of students, many times the teacher assumes that students that do not speak up have mastered the material but the results of an assessment over that topic frequently indicate something different.

Students can gain the metacognitive skills by a science lesson based on the constructivist approach. In recent years, "constructivist learning" theory which has an important place in the field of science education, aims to educate students who play an active role of engaging in research for deep knowledge, and use the information they have learnt rather than the students, who play a passive recipient role in information. There are approaches such as cooperative learning and inquiry based learning which can develop metacognitive skills among students.

The cooperative learning and inquiry based learning would be easy to put into metacognitive practice in the science classroom even with the pressure of syllabi and the demand for marks from the parents. In this article, an attempt is made to compare the influence of the cooperative learning and inquiry based learning in science classroom of higher secondary students.

DESIGN OF THE STUDY

The research was carried out using a quasi-experimental design with pre- and post tests with two experimental groups and one control group. Higher secondary students from Municipal Girls Higher Secondary School, Tirunelveli town, Tamilnadu, India were taken as the sample of the study. The sample was divided into three groups consisting of 35 students. Each group is almost having equal number of low ability students and high ability students. Those students who have scored below 35 out of 100 in science in school record are treated as low ability students. Remaining students are treated as high ability students. The three groups were first administered metacognitive awareness test (MAT) and the results have been compared in order to study the equivalence of the groups.

50

Table 1: Comparison between control and experimental groups in MAT pre-test

Group	N	Mean	S.D	't' value	Remarks at 0.01 level
Control group	35	22.9	7.1	0.77	Not significant
Experimental group1 (Inquiry based learning)	35	24.2	6.9		
Control group	35	22.9	7.1	0.46	Not significant
Experimental group2 (Cooperative learning)	35	23.7	7.3		

From Table 1 there is no significant difference between metacognitive awareness pre-test mean scores achieved by experimental groups with control group. The researchers assigned three experienced teachers to teach the experimental and control groups and trained them on the basic skills of metacognitive strategy before the commencement of treatment. The three teachers selected to teach the subjects had taught science for the past ten years and both of them were graduates of science. The three teachers had similar experiences on teaching skills based on their training as teachers. The teachers were randomly assigned to the experimental and control classes. All the classes were taught by their respective teachers at the early hours of the day.

INSTRUMENT

The standardized tool for metacognitive awareness developed by Schraw and Dennison(1994) was used in the present study. It consists of 52 items. It is used as a metacognitive awareness tool by many researchers in metacognition research.(Lin,2002; Lippmann,2005) The items helps to identify the presence of metacognitive behaviour among students. Items were reviewed for face validity. Wording and grammatical structures were changed according to the local Indian context and the target groups' level.

TREATMENT PROCEDURE

The researcher had gone through the 12th standard text book of National Council for Educational Research and Training of Indian Government. The chapter human anatomy was selected for the study. The topics were: Integumentary system, Skeletal system, Muscular system, Digestive system, Circulatory system, Lymphatic system and Nervous system. The study consisted of three different treatments: a control group, Inquiry based metacognitive instructions group and cooperative learning based metacognitive instructions group. The study lasted for 20 days.

The control group was taught in the existing normal process of teaching followed and answering cognitive questions that were related to the material being taught. Students were asked to share the information with the entire class if they so desired. The teaching of students in this group was centered on the use of the textbook. Instead of discussing the material, helping each other, students read the assigned reading material silently, completed assignments independently at their seats.

The experimental group1 i.e. inquiry based metacognitive instructions group followed the procedure used by the control group with one modification. The investigator formulated pivotal questions in advance. After the lesson taught, the teacher conducted inquiry based learning by posing carefully drafted questions. Metacognitive questions were framed in terms of student responses. The students were asked to respond to these questions, which helped them to develop higher level of thinking. For example, teacher provides metacognitive instructional practice such as *what information is important to remember? What do you need to do if you don't understand? Are you on the right way? How should you proceed?* When they are monitoring lesson they are guided to ask themselves the metacognitive questions. How am I doing? What information is

51

important to remember? What do I need to do if I don't understand? How well did I do? Did my particular course of thinking produce more or less than I had expected? What could I have done differently? Do I need to go back through the topic to fill in any "blanks" in my understanding? Students engaged in discussions with the teacher in response to the teacher's questions. But pivotal questions planned in advance gave direction and thrust to the lesson and helped to accomplish the goal. Hartman(2001) states that teaching with metacognitive strategies means that teacher will think about how their questions will activate and develop students' metacognition.

The experiment group2 i.e. cooperative learning based metacognitive instructions group followed the procedure used by the control group with one modification. After the lesson taught, individual students in the group read the textbook. Each student was paired off with a classmate to discuss the topic with the help of metacognitive instructions. In the cooperative learning strategy students have the opportunity to discuss their answers with fellow students. The students could jot –down their answers to a question, turn to their neighbour and talk about their answers and sharing the same with the entire class. It forces student to discuss their thinking, analyze their position, and explain their point of view to their classmates. By their sharing information with the entire class, students would be able to evaluate themselves while gathering information from other classmates. The teacher would also have the opportunity to evaluate the students' understanding based on the content of the discussions. Some of the questions that are posed during the discussion can be meaningful and multifaceted.

The cooperative learning group incorporated the following metacognitive strategies recommended by Blakey and Spence (1990):
1. Define what you know and what you do not know:
Students determine their levels by asking themselves 'What is my relevant information about the subject?' What do I know? What do I want to learn? What do I not know?

2. Talk about what you are thinking:
This includes the loud thinking in the process of making plan or problem solving. This study can be performed in peer groups or in small groups, that one student assumes the role of a teacher. These students talk and ask questions by telling and making explanations and abstraction.

3. Keeping a diary of thinking:
Students can write difficulties and their interpretations about problems in that notebook. They also note the process and methods used to solve the problem. Thus, students have the idea about experience and methods of thinking.

4. Planning and self-control:
It is students' plan to control the process that is relevant to the subject that is going to be learnt. However, students must have earned some characteristics in advance such as adjusting time, identifying and using materials.

5. Thinking process briefing:
This strategy covers, develops and uses the metacognitive and thinking skills that the students acquired. It involves a three-step method. Primarily, the teacher needs to guide the students about how they gained information by thinking in class and how they took part in activities. In the next stage, students need to group ideas and define which thinking strategies they used, and in the final stage, students should evaluate their own achievements and make assessments about their election in relation to future strategies.
6. Self-assessment:

It is the determination of the metacognitive skills of the students by the pre-prepared individual checklist in the form of assessment. Metacognitive strategies are the sequential processes used to provide control in learning and in reaching one's goal. They help individuals significantly to make regulations and take control of their learning. For example, after reading a text, a student can query himself about the concepts discussed in the paragraph. This self evaluation is a monitoring metacognitive strategy and at this stage, the cognitive purpose of students is to understand texts. If a student fails to answer his own question, he must determine what he needs to perform his cognitive purpose which is to understand the text.

RESULTS

Statistical calculations such as paired 't' test was used to analyse the data.

Table 2: Comparison of MAT score using paired 't' test

Group	N	Mean		SD		Paird test 't' value	Remarks at 0.01 level.
		Pre test	Post test	Pre test	Post test		
Control group	35	22.9	24.3	7.1	5.4	2.2	NS
Experiment group1 (Inquiry based learning)	35	24.2	31.2	6.9	4.2	5.6	S
Experiment group2 (Cooperative learning)	35	23.7	36.7	7.3	3.8	7.2	S

NS- Not significant   S- Significant.

The observed 't' value for the control group was $t(34)=2.2(p>0.01)$. Hence there is no significant improvement in metacognitive awareness in control group. In the experiment group1 the t value was $t(34)=5.6(p<0.01)$. It shows that there is significant improvement in metacognitive awareness in inquiry based learning. In the experiment group2 the t value was $t(34)=7.2(p<0.01)$. It indicates there is significant improvement in metacognitive awareness in cooperative learning.

The results revealed that the cooperative learning group received higher metacognitive awareness and they could also answer higher level of cognitive questions compared to inquiry group and control group.

Table 3: Comparison of MAT scores of low ability students using paired 't' test

Group	N	Mean		SD		Paird test 't' value	Remarks at 0.01 level.
		Pre test	Post test	Pre test	Post test		
Control group	35	15.4	22.4	4.2	3.6	1.9	NS
Experiment group1 (Inquiry based learning)	35	16.1	23.7	4.4	3.1	2.1	NS
Experiment group2 (Cooperative learning)	35	15.9	31.7	4.1	2.8	7.9	S

NS- Not significant   S- Significant.

The observed 't' value for the control group was $t(34)=1.9(p>0.01)$. Hence there is no significant improvement in metacognitive awareness of low ability students in the conventional lecture method. In the experiment group1 the 't' value was $t(34)=2.1(p>0.01)$. It shows that there is no significant improvement in metacognitive awareness of low ability students in inquiry based learning. In the experiment group2 the t value was

t(34)=7.9(p<0.01). It indicates there is significant improvement in metacognitive awareness of low ability students cooperative learning.

The results revealed that the low ability students in cooperative learning group received higher metacognitive awareness and they could also answer higher level of cognitive questions compared to inquiry group and control group.

DISCUSSION

The findings of this study have demonstrated the effectiveness of method to promote metacognitive awareness in the teaching and learning of science at the higher secondary school level of education. This study is also significant in that it demonstrated the effects of inquiry and cooperative learning on students' metacognitive awareness in one single study.

One major finding of this study is that students taught using the cooperative learning approach scored higher marks in metacognitive awareness than those taught using the inquiry based method. This may have been achieved by the high level of students' participation in learning activities. All the students in the cooperative learning performed specific roles in solving problems which are presented in the classroom to the benefit of all members of the group. When learners are confronted with problems which they must solve, they are forced to reason and think critically in order to solve the problems. It is believed that when properly and carefully used metacognitive activities engage the students in the learning process and seek to improve the critical thinking, reasoning and problem solving skill of learners (Taylor,1999; Coutinbo,2007; Magno,2010).

In the control group , when the teacher explains a concept to the whole class only the high achievers are able to follow the class while the low achievers may simply be listening without grasping the facts. They are not benefited by the conventional lecture given to the whole class.

CONCLUSION

As described in this study, cooperative learning makes sense for students' metacognitive awareness, is a very viable option among other instructional methods for teaching science in higher secondary schools. The major purpose of student-student interaction during cooperative learning is to promote metacognitive awareness. The interaction among students in cooperative learning groups is intense and prolonged. Teachers must improve their students' metacognitive awareness in order to improve their learning abilities. "The more students know about effective learning strategies, the greater their metacognitive awareness and the higher their classroom achievement is likely to be"(Mango 2010).

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REFERENCES

Blakey M, Spence S (1990). Developing Metacognition. Syracuse, NY: ERIC Resources Information Center [ED327218].

Brown AL (1980). Metacognitive Development and Reading. In R.J. Spiro, B. Bruce, W. Brewer (Eds.), Theoretical Issues in Reading Comprehension. Hillsdale, NJ: Lawrence Erbaum

Brown, A. L. (1987). Executive control, self- regulation, and other more mysterious mechanisms. In F. Weinart & R. Kluwe (Eds.), Metacognition, Motivation and Understanding (pp 65-116). Hillsdale,NJ: Erlbaum.

Candan AS (2005). Metacognitive Theory and History Teaching. Kastamonu Educ. J., 13 (2): 327-332.

Coutinbo, S.A.(2007). The relationship between goals, metacognition and academic success. *Educate*, 7(1), 39-47.

Ellis, G. (1999). Developing metacognitive awareness-the missing dimension. The Journal, 10, 1-6.

Flavell JH (1976). Metacognitive Aspects of Problem Solving. In L.R. Resnick (Ed.), The Nature of Intelligence. Hillsdale, NJ: Lawrence Erbaum.

Hartman, H.J. (2001). Metacognition in learning and instruction, theory, research and practice, Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Kramarski, B., Mavrech, Z. R & Arami, M. (2004). The Effects of metacognitive instruction on solving mathematical authentic tasks. *Educational Studies in Mathematics*, 49, 225-250.

Lin, X.D. (2002). Developing students' metacognitive awareness in asynchronous learning networks in comparison to face to face discussion groups. *Journal of Educational Computing Research,* 36(4), xxx.

Lippmann, R. (2005). Analyzing students' use of metacognition during laboratory activities. *Learning Individual differences*, 14, 131-137.

Magno, C. (2010). The role of metacognitive skills in developing critical thinking. *Learning, Memory, and Cognition*, 36(1), 255–262.

Ozsoy G (2008). Metacognition. Turkish Educ. Sci. J., 6 (4): 713-740.

Taylor S (1999). Better learning through better thinking: Developing students' metacognitive abilities", J. College Reading and Learning, 30(1): 34.

Schraw, G., & Dennison, R.S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19, 460-475.

Sheila R. Vaidya. (1999). Metacognitive learning strategies for students with learning disabilities. Educator.

E- AND M-LEARNING: A COMPARATIVE STUDY

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ABSTRACT

21st century declared to be the age of information and communication technology. This is the time when more people everywhere are involved in acquiring new knowledge and skills. The world is undergoing transformations due to rapid development of Information and Communication Technology. We can not work in the society without on-line technology. Online technology is also entered in the field of education. Electronic Learning is a subset of Distance Learning and Mobile Learning is a Subset of E-learning. E-learning and M-learning have become extremely important buzz words of the educational technological revolution; each characterising a whole raft of ideas and resources for the tech-savvy teacher. But the two terms are not always used correctly, with some confusion about the differences between them and where they overlap. And in more complex terms, thinking about the differences between E-learning and M-learning can be particularly useful for teachers who use technology in the classroom, as it can help them to pick out which techniques are best for which education scenario. The present paper was based on secondary sources of data highlighting the comparison of concept, characteristics, advantages, disadvantages, similarities and differences between E-learning and M-learning.

Key Words: E-learning, M-learning, U-learning, ICT, Technology, ET, Distance learning.

INTRODUCTION

E-learning plays an important role in the educational growth of any nation. It also offers opportunities for developing nations to enhance their educational development. It can also plays a critical role in preparing a new generation of teachers, as well as upgrading the skills of the existing teaching force to use 21st century tools and pedagogies for learning. So it is the changing trend in education. The modern technologies particularly the internet made education no longer limited to the four walls of the class room. E-learning comprises all forms of electronically supported learning and teaching. The information and communication systems, whether networked or not serve as specific media to implement the learning process. The term will still most likely be utilized to reference out-of classroom and in-classroom educational experiences via technology, even as advances continue in regard to devices and curriculum.

Mobile learning combines E-learning and mobile computing. Mobile learning is sometimes considered merely an extension of E-learning, but quality M-learning can only be delivered with an awareness of the special limitations and benefits of mobile devices. Mobile learning has the benefits of mobility and its supporting platform. M-learning is a means to enhance the broader learning experience. M-learning is a powerful method for engaging learners on their own terms. E-learning and M-learning diagrammatically mentioned below:--

Functionality		Mobility		
Computer	Laptop computers	PDA's handhelds palmtop	Smart phones	Mobile phone
E- Learning		M-Learning		

(Functionality and mobility in a definition of mobile learning)

Though there are some differences lies between E-learning and M-learning, they are closely related. M-learning is a sub-set of E-learning. Their relationships are diagrammatically given below:-
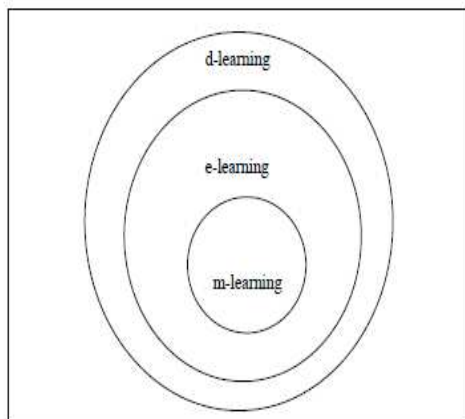
Perspective of learning paradigms
(Georgiev et al., 2004)
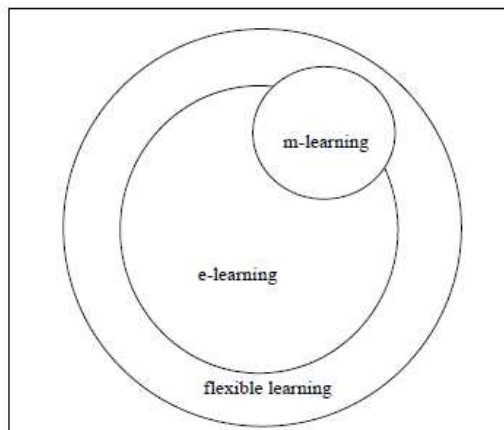
Relationship of E-learning, M-learning
& Flexible Learning (Low and O'Connell, 2006)

Mobile technology in word open various ways for new educational technologies aimed at fulfilling the country's educational needs. There are various ways to use mobile phones for enhancing learning. Mobile phone plays an important role in our day-to-day lives in various purposes. One of the important purposes is learning. Mobile learning, as a novel educational approach, encourages flexibility; students do not need to be a specific age, gender, or member of a specific group or geography, to participate in learning opportunities. Restrictions of time, space and place have been lifted.

SIGNIFICANCE OF THE STUDY

In this new millennium modern technology plays inevitable role in our lives. The technological revolution poses tremendous challenges to the educators to rethink their basic tenets, to apply technology in creative way to redesign education. In this context, E-learning and M-learning play an important role. These are the new innovations which help greater learning opportunities for the students. The study will cover a wide range of topics relating the context of E-learning, M-learning, their characteristics, advantages and disadvantages. The present study also judges the similarities and differences between E-learning and M-learning. The study reveals with supporting education through modern technology, solving educational problems, promoting educational outcomes linking it with real life situations.

Objectives Of The Study

The following were the specific objectives of this study:

➢ To shed light on the concept of E-learning and Mobile learning.
➢ To focus on the characteristics of E-learning and Mobile learning.
➢ To compare the advantages of E-learning and Mobile learning.
➢ To compare the disadvantages of E-learning and M-learning.
➢ To judge the similarities and differences between E-learning and Mobile learning.

Research Questions

The study addressed the following questions:
• What is meant by E-learning?
• What is meant by M-learning?
• What are the characteristics of E- learning?
• What are the characteristics of mobile learning?
• What are the advantages and disadvantages of E-learning?

66

- What are the advantages and disadvantages of mobile learning?
- What are the similarities and differences between E-learning and mobile learning?

Design Of The Study

The researcher was adopted the analytical descriptive approach in collecting data, information, facts, concepts and opinion related with various phases of this study. The researcher was also reviewed previous literature of the concept, characteristics, advantages and disadvantages of E-learning and Mobile learning.

Plan Of The Study

The study was done in five main phases:

1. First Phase: The concept of E-learning and M-learning.
2. Second Phase: The characteristics of E-learning and Mobile learning.
3. Third Phase: Comparison between the Advantages of E-learning and M-learning.
4. Fourth Phase: Comparison between the Disadvantages of E-learning and M-learning.
5. Fifth Phase: Similarities and differences between E-learning and mobile learning.

1. First Phase: The concept of E-learning and M-learning

E-learning is the acquisition and use of knowledge distributed and facilitated primarily by electronic means. It may include the use of web-based teaching materials and hypermedia in general, multimedia CD-ROMs, websites, discussion boards, collaborative software, e-mail, blogs, wikes, test chat, computer aided assessment, educational animation, simulations, games, learning management software, electronic voting systems and more, with possibly a combination of different methods being used. E-learning is an approach to facilitate and enhance learning through and based on both computer and communication Technology. It is used to support distance learning through the use of WANS (Wide Area Net Workers), and may also be considered to be a form of flexible learning where learning is possible in no time. E-learning is also called 'online learning'. It is developed to apply information technology skills to education getting connected to the internet or any network is essential for E-learning. E-learning or Electronic learning is a general term used to refer to computer-enhanced or technology enhanced learning. E-learning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face to face teaching, in which case the term blended learning is commonly used. E-learning is a means of education that incorporates self-motivation, communication, efficiency, and technology. It is a flexible term used to describing a means of teaching through technology. E-learning refers to the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance (Rosenberg, 2001; Wentling et al., 2000). In general, E-learning is the expression broadly used to describe *"instructional content or learning experience delivered or enabled by electronic technologies"* (Ong and Wang, 2004). Broadly, we can define it as *"the use of the Internet, intranets / extranets, audio and videotape, satellite broadcast, interactive TV, and CD-ROM, not only for content delivery, but also for interaction among participants"*. Elliott Masie defines *"E-learning as the experience dimension of E-learning, which includes such factors as engagement, curiosity, simulation and practice"*. E-learning can be defined as *the use of any of the new technologies or applications in the service of learning or learning support* (Laurillard, 2006). E-learning means sharing knowledge using technology, computer and network-enabled transfer of skills and knowledge. E-learning applications and processes include Web-based learning, computer-based learning, virtual classroom and digital collaboration. Content is delivered via Internet, intranet/extranet, wireless telephonic, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio. It is the use of the Internet and related technologies for the development, distribution and enhancement of learning resources. This form of learning currently depends on networks and computers, but will likely evolve into systems consisting of a variety of channels (e.g., wireless, satellite), and technologies (e.g., cellular phones, personal digital assistants) as they are developed and adopted. E-learning can take the form of courses as well as modules and smaller learning objects. E-learning may incorporate synchronous or asynchronous access and may be distributed geographically with varied limits of time (Wentling, Waight, Fleur, Wang, and Kanfer, 2000).

There are some other definitions of E-learning which are as follows:

➤ E-learning is instruction that is delivered electronically, in part or wholly – via a Web browser, through the Internet or an intranet, or through multimedia platforms such as CD-ROM or DVD (Hall, 1997).

67

➢ E-learning is a structured, purposeful use of electronic system or computer in support of the learning process (Allen, 2003).

➢ E-learning covers a wide set of applications and processes, such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes delivering content via the Internet, intranet/extranet (LAN/WAN), audio and videotape, satellite broadcast, interactive TV, and CD-ROM (ASTD, 2001).

➢ E-learning is training delivered on a computer (including CD-ROM, Internet, or intranet) that is designed to support individual learning or organizational performance goals (Clark and Mayer, 2003).

Mobile learning, sometimes called M-learning, is learning accomplished with the use of small, portable computing devices. These computing devices may include: smart phones, personal digital assistants (PDAs) and similar handheld devices. There is some debate on the inclusion of tablet and laptop computers. Often, wireless two-way internet connection is assumed as an integral component. Mobile learning refers to the use of mobile or wireless devices for the purpose of learning while on the move. Typical examples of the devices used for mobile learning include cell phones, smartphones, palmtops, and handheld computers; tablet PCs, laptops, and personal media players can also fall within this scope (Kukulska-Hulme & Traxler, 2005). M-learning is the idea that a student can learn from any place at any time using portable learning devices. M-learning or 'mobile learning' is any sort of learning that takes advantages of learning opportunities offered by mobile technologies.

• M- learning means "*acquisition of <u>any</u> knowledge and skill through using mobile technology <u>anytime, anywhere</u> that result in <u>alteration of behaviour</u>*".

• M- learning also brings strong portability by replacing books and notes with small RAM's filled with tailored learning contents.

• M-learning implies different things to different people. Here there are some definitions of M-learning given below:

• According to Quinn (2000) *"Mobile learning is learning through mobile computational devices"*.

• Shepherd (2001) Says: M- learning is not just electronic, it's mobile.

• Colazzo, Ronchetti, Trifonova, and Molinari (2003) state that, "*A mobile learning educational process can be considered as any learning and teaching activity that is possible through mobile tools or in settings where mobile equipment is available.*"

• Polsani (2003) defines *"mobile learning as a form of education whose site of production, circulation and consumption is the network"*.

• Pinkwert et. al. (2003), who defines M-learning as *". . . E-learning that uses mobile devices and wireless transmission."*

• Trifonova (2003) Any form of learning (studying) and teaching that occurs through a mobile device, or in a mobile environment.

• Sharples (2005), who defines M-learning *" . . . as a process of coming to know, by which learners in cooperation with their peers and teachers, construct transiently stable interpretations of their world."*

• Traxler (2005) defined it as *"any educational provision where the sole or dominate technologies are hand held and palmtop devices."*

• Pea and Maldonado (2006) stated that mobile learning incorporates *"transformative innovations for learning futures"*.

• Parsons & Ryu (2006) M-learning is broadly defined as the delivery of learning content to learners utilizing mobile computing devices.

• Peters (2007) also stated that it was a subset of E-learning, a step toward making the educational process *"just in time, just enough and just for me"* (Peters, 2007, p. 15).

• Ally (2009) The process of using a mobile device to access and study learning materials and to communicate with fellow students, instructors or institution.

M-learning provides the potential to provide the right information to right people at the any time and any place using portable learning devices. Thus the M-learning can be summarized in a single statement – *"deliverance of education or any learning via any portable devices".*

68

2. Second Phase: The Characteristics of E-learning and Mobile learning

There are some important characteristics of E-learning mentioned below:

- **Empowered by digital technology:** E-learning is pedagogy empowered by digital technology.
- **Computer enhanced learning:** E-learning is a term which is used to refer computer enhanced learning.
- **Technology enhanced learning:** E-learning includes all types of technology enhanced learning (TEL), where technology is used to support the learning process.
- **Online learning:** Use of E-learning is generally confined to "on-line learning" carried out through the Internet or Web-based technology, with no face-to-face interaction.
- **More than CBL and CAI:** E-learning conveys broader meaning than the terms CBL (Computer based learning) and CAI (Computer assisted instruction).
- **More than on-line learning:** E-learning is broader in its meaning that they conveyed through the simple terms like "on-line learning" or "on-line education".
- **Not synonymous to audio-visual and multimedia learning:** E-learning should not be considered as synonymous to audio- visual learning, multi-media learning, distance education or distance learning. Although the audio-visual and multimedia technology and distance education programmes are based on the Internet and Web services provided through the computers, yet these are not identical but complementary.
- **Confined to Web-based and Internet-based learning:** The use of the term E-learning should be confined to the type of learning carried out, supported or facilitated through Web enhanced instruction and the Internet based communications like e-mail, audio and video conferencing, mail list, live chats and telephony.
- **Exclusion of non-Internet and non-Web technology:** All types of non-Internet and non-Web technology are not included in E-learning.
- On the other hand M-learning has following characteristics:
- **Accessibility -** The information is always available whenever the learners need to use it.
- **Immediacy -** The information can be retrieved immediately by the learners.
- **Interactivity -** The learners can interact with peers, teachers and experts efficiently and effectively through different media.
- **Context-awareness -** The environment can adopt to the learners real situation to provide adequate information for the learners.
- **Permanency -** The information remains unless the learners purposely remove it.
- Flexible Learning, Large mass covered, reduces students' indiscipline and unrest problem.
- Used Very where at every time.
- Most of mobile devices have lower prices than desktop PCs.
- Similar size and light weight than desktop PCs.
- Ensure bigger students engage as M-learning is based on modern technologies, which students use in everyday life.

3. Third Phase: Comparison between the Advantages of E-learning and M-learning

The following are the advantages of E-learning:

- **Individualized instructions:** E-learning provides individualized instructions suiting to the need, abilities, learning styles and interests of the learners. E-learning has much potential to make the education, instruction and learning opportunities provided to the learners adaptable to the need, local need and resources at their hands. Thus, it is learner centred.
- **Easy access:** The learner gets access to learning by breaking all barriers of time, place and distance. The learners can access information and educational contents anytime and at anyplace. E-learning is available even in areas where there is no school or college. It can reach any remote or far off areas of the country or world.
- **Disadvantageous children:** it is available for those with poor health or disadvantageous conditions that can inhibit them from under going any institutionalized education. E-learning enables even handicapped liked deaf and dumb to learn.

69

- **Qualitative:** E-learning has a unique feature of arranging an access to unlimited number of students the same quality of the content that a fulltime student has.
- **Effective media:** E-learning can prove an effective media and tool for facing the problem so lack of trained teachers, shortage of schools and needed facilities for providing quality education to the number of students residing in far and wide corners of the country.
- **Different learning styles:** Unlike traditional classroom education, E-learning can cater to different learning styles and promote collaboration among students from different localities, cultures, regions, states and countries.
- **Flexibility:** The flexibility of E-learning in terms of delivery media (like CD, DVD, Laptops and Mobile Phones), type of courses and access may prove very beneficial for the learners.
- **Play-way spirit and learning by doing:** Learning experiences via simulated and gaming techniques may also provide the advantages of getting richer experiences on the useful pedagogical footings of play-way spirit and learning by doing or leaving.
- **Interesting and motivating:** E-learning may make the students more interested and motivated towards learning as they may get a wide variety of learning experiences by having an access to multimedia.
- **On-line, Off-line and live interaction:** The opportunities of having an on-line, off-line and live interaction between the students and teachers and among the students themselves may make the task of E-learning a joy and best alternative to the lively face-to-face interaction and real time sharing of the experiences in a traditional classroom settings.
- **Self-learning and self-improvement:** E-learning leads to self-learning. It can be utilized for improving technical and vocational skills.
- **Evaluation and feedback:** E-learning can also provide opportunities for testing and evaluating the learning outcomes of the learners through teachers, peers and auto-instructional devices and software available with there a ding material online, or through the internet and mobile phone facilities

There are also a lot of advantages of mobile learning. These are listed below:-

- **Increased mobility:** Learning is not restricted to fixed locations any more. Mobile devices allow learners to access learning content and learning interactions anywhere, such as factories, museums, hospitals, shopping malls, cafes and outdoor areas.
- **Time-saving:** People can now study when they are commuting and traveling.
- **Environmental-friendly:** It is amazing to find out how much information a mobile device can carry despite its light weight. Less printing is required.
- **Interactive:** Mobile technology enables students to closely link with their peers, teachers, distant partners, and even interest groups worldwide.
- Use of relatively inexpensive everyday technologies.
- Better opportunities to acquire skills at one's own pace, with a degree of privacy that may be missing when using shared computer facilities or relying on equipment belonging to somebody else.
- Good support for preferred modes of interaction, e.g. accessing audio content or participating in social networks on the move.
- Catering for interests beyond what is provided in class, through access to additional content such as podcasts or free learning materials (e.g. Open Learn).
- Handheld devices are often an everyday part of business, so learning can contribute directly to enhancing employability, life skills and work practices.
- Opportunities for learners to give immediate feedback on their learning experience.
- Better assessment and diagnosis of learning problems as they occur.
- Psychological support for those at risk of dropping out, through social networks or personal guidance from a mentor.
- Learning materials can become accessible to a larger audience, through podcasts, mobile applications, blogs and e-books, which are seen by potential students.
- Catering for disadvantaged social groups for whom mobile learning presents an opportunity to improve their life chances.

70

- Revitalizing the curriculum, rethinking teaching methods and implementing improved feedback to learners.
- Turning geographically dispersed learners into a valuable teaching resource by enabling them to contribute their local knowledge and research data more easily.
- Supporting learner retention, progression and transition.
- Making the learning experience more tailored to the changing needs of individuals, encouraging learners to return for knowledge updating and further study.
- Mobile educational systems have started to emerge as potential educational environments supporting lifelong learning though other forms of learning like distance learning etc are very popular in India, learning is yet to find a pathway into Indian educational system. Also to notice that India's mobile services market is growing at a very rapid pace and the technological base required supporting mobile devices is also quite strong in India. So India has the potential to be considered as a strong market for M-learning.
- The learning material is mostly colourful and inviting which may prompt students to go back and forth and practice more.
- Learner gets stimulated in learning.
- Convenient.
- Interesting.

4. Fourth Phase: Comparison between the Disadvantages of E-learning and M-learning

The following are the disadvantages of E-learning:

- **Requires knowledge and skills:** E-learning requires special knowledge and skills for the use of multimedia Internet and Web technology on the part of the users. Lack of knowledge and skills on this account may prove futile in taking advantages from the valuable services of E-learning.
- **Lack of equipment:** Most of our schools are not at all ready, willing and equipped for making use of E-learning in the proper interest of the teachers and students. Leaving aside a small number of self financing public schools meant for children of rich parents, most of the schools in our country cannot even imagine for venturing in the area of E-learning.
- **Costly:** E-learning is more costly than traditional education. E-learning tools are very expensive. Their repair is also very expensive. Hence, E-learning is beyond the rich of most of the students. They do not have resources for purchasing electronic equipment.
- **Feeling of Isolation and Missing Social Contact:** The feeling of isolation experienced by the users of E-learning is one of the main defects quite visible in any system of distance learning including E-learning. There is no face-to-face interaction and humanistic touch profoundly available in the traditional class room setup. Moreover the lack of social participation and community sharing experiences may prove handicap to the students of E-learning in their adequate physical, emotional and social development.
- **Lack of provision for teacher training programme:** There is lack of provision of equipping the teachers in their pre-service or in-service programmes for getting acquainted with the knowledge and skills required on their part for the use of E-learning at their work places. As a result, the teachers neither have any inclination towards E-learning nor have any competence for its organization in the school or providing guidance to their students in its use.
- **Negative attitude:** An overall attitude of the learners, teachers, parents, educational authorities and society is usually found negative towards the processes and products of E-learning. E-learning is adjusted as second rate in comparison to regular classroom teaching.
- **Adverse effect on health:** E-learning adversely affects the eyesight and some other parts of the body. The learners become physically inactive. Sometimes they become victims of physical diseases.
- **Lack of co-curricular activities:** Co-curricular activities have great importance in the field of learning and education. But these activities are neglected in E-learning.
- **Technical defect:** E-learning is based on technology. When technical defect occurs, E-learning stops. As a result, continuity of learning is broken and there is no progress in E-learning.
- Stressful and consumed more time.

There are also a lot of disadvantages of mobile learning. These are listed below:
- There is no denying that the storage capacities of PDA are limited.

71

- Device may become outdated quickly and students have to keep combating obsolescence.
- The buttons on the keypad or styles pens are small and can be trickly for some people to manipulate. There are attachable keyboards available for some devices but these are also small, can be different to use to cost money.
- Too small display.
- Usable with some models only.
- Network connectivity limitations.
- Expenses / Costs.

5. Fifth Phase: Similarities and Differences between E-learning and Mobile learning

E-Learning is a subset of Distance Learning – Mobile Learning is a Subset of E-Learning. The conceptual shifts from E-learning to M-learning then to u-learning are given below:-
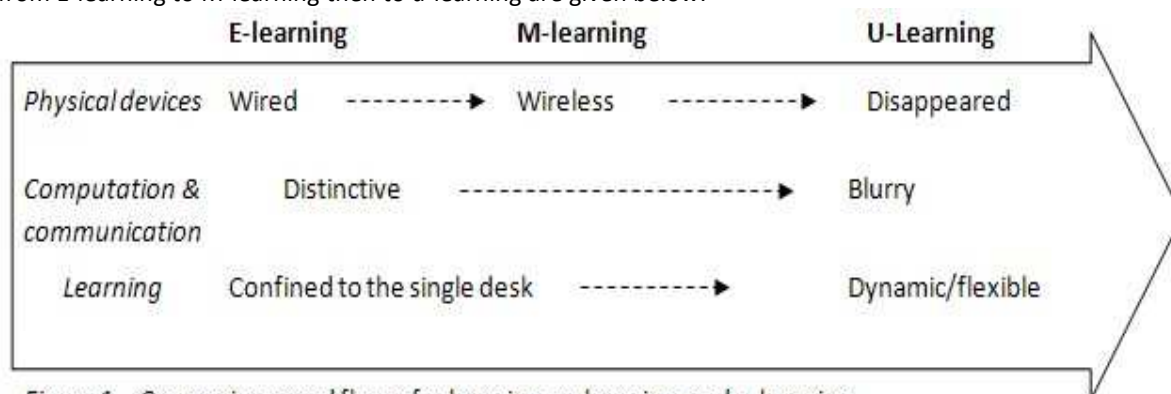
Figure 1. Comparisons and flow of e-learning, m-learning, and u-learning.

Similarities

- Each of them needs an infrastructure and a wide community base in dealing with wire and wireless electronic computer technologies.
- Each of them needs a high cast technological system.
- E- and M-learning provide students with digital literacy focusing on information processing.
- Students are centre of learning process in both models (Self- Learning).
- In both learning models students can access and surf the internet.
- E-and M- learning models allow communication between individual students and between students and teachers anywhere and at anytime from one hand, and communication with local and international on the other via the use of e-mails and text message.
- In both learning models the learning content is delivered in the form of texts, images and video clips.
- Both learning models depend on developing problem solving and creative thinking skills among students.
- E-and M- learning models are capable of providing learning opportunities to many students.
- Learning material can be updated continuously in both learning models.

Differences

- E- learning use fixed, wire devices such as PC's, but mobile learning uses wireless communication devices such as cell and smart phones, micro computers and personal digital assistants.
- In E- learning, access to the internet is achieved the available telephone service, while mobile learning uses IR when accessing the internet anywhere at any time.
- In E- learning, messages are exchanged via the internet whereas MMS and SMS messages are used to exchange information between users.
- In E-learning, it is difficult to transfer books and files between individual learners, while in mobile learning, Bluetooth and IR technologies are used to exchange books and files among learners.
- Storage applications used in E-learning are more effective than ones used in mobile learning.

> - Communication channels used in E-learning have low protection levels as learners use more than one device, whereas mobile learning provides users with more protection as learners use their own devices to connect with others.
> - It is difficult to pass devices through learners in E-learning while these devices are easy to pass between learners in mobile learning.

In an attempt to distinguish E-learning from M-learning, Sharma and Kitchens (2004).

E-learning	**M-learning**
Computer	Mobile
Bandwidth	Bluetooth
Multimedia	Objects
Interactive	Networked
Hyperlinked	Situated Learning
Collaborative	Realistic Situation
Distance Learning	Constructivism
Simulated Situation	Social Interaction
Hyper Learning	Collaborative

Traxler (2007) attempts to further distinguish E-learning from M-learning by analyzing the descriptions of both fields found in the literature. Comparison of E-learning to M-learning (Traxler, 2007):

E-learning	**M-learning**
Structured	Personal
Media-Rich	Spontaneous
Broadband	Disruptive
Interactive	Opportunistic
Intelligent	Informal
Usable	Pervasive
	Situated
	Private
	Context-Aware
	Bite-Sized
	Portable

Differences between E- and M-learning environments with respect to methods of Evaluation, communication between actors, and terminology.

E-learning	**M-learning**
Computer	Mobile
Bandwidth	GPRS, G3, Bluetooth
Multimedia	Objects
Interactive	Spontaneous
Hyperlinked	Connected
Collaborative	Networked
Distance learning	Situated learning

Respect to communication between actors (instructor and student)

E-learning	M-learning
Communication	Communication
Asynchronous	Synchronous
Scheduled	Spontaneous
Time-delayed	Instant delivery
Passive	Instant

Student and student

E-learning	M-learning
Face-to-face	Flexible
Audio-teleconference common	Audio and video- conference possible
Private location	No geographic boundaries
Travel time to reach Internet site	No travel time since wireless connectivity

Respect to methods of Evaluation

E-learning	M-learning
1-to-1 basis possible Asynchronous and at times delayed	1-to-1 basis possible Both asynchronous and synchronous
Mass/standardized	Customized
Instruction	Instruction
Benchmark-based grading	Performance & improvement-based grading
Simulations & lab based experiments	Real-life cases and on the site experiments
Paper-based	Less paper, less printing, lower cost

CONCLUSION

However E- and M-learning play an important in the field of modern education. In spite of some differences, there are some relationship lies in them. E- and M-learning encourage both teachers and students to take personal responsibility for their own learning. When teachers succeed it builds self-knowledge and self confidence in them. The recent trend in E-learning sector is screen casting. E- and M-learning will also bring a substantial change in the method of spreading knowledge to improve the quality in teacher education and hence will make teachers of global standard. Thus, these are beneficial to education, corporations and to all types of teachers / learners. It is the effective learning process created by combining digitally delivered content with learning support and service. Therefore, we can conclude that teachers need to acquire technological skills in order to succeed in E-learning. Mobile technology is also used in learning purpose. It is an innovative educational approach which provides learning opportunities to the students.

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REFERENCES

Allen, M.W. (2003). *Michael Allen's guide to E-learning*. Hoboken, New Jersey: John Wiley & Sons, Incorporated. Ally, M. (Ed.). (2009). *Mobile learning: Transforming the delivery of education and Training.* Athabasca University Press.

Ahuja, N., Ahuja, T. & Holkar, A., *Need and Significance of E-learning in Education*, Retrieved from http://pioneerjournal.in/conferences/tech-knowledge/14th-national-conference/3802.

Attewell. J. (2005) Mobile Technologies and Learning, London Learning and Skills Development Agency.

Awad. A. A (2007) *Technology of M- learning … A step toward a better learning*, Available: amanysm 9498.jeeran.com

Begum, A.J., Natesan, A.K. & Sampath, G. (2011). *ICT in Teaching Learning*, New Delhi: APH Publishing Corporation.

Clark, R.C., and Mayer, R.E. (2003). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. San Francisco, California: John Wiley & Sons, Incorporated.

Colazzo, L., Molinari, A., Ronchetti, M., & Trifonova, A. (2003). Towards a Multi-Vendor Mobile Learning Management System. Proceedings for the *World Conference on E-learning.* Phoenix, USA. Retrieved April 24, 2007. from:http://www.science.unitn.it/~foxy/docs/Towards%20a%20multivendor%20Mobile%20LMS%20(long).pdf

Conrad, K. (2000). *Instructional design for web-based training*. Amherst, Massachusetts: HRD Press.

Dahshan, J. A., *M-learning … Its characteristics*, Available: www.et ar.net/vb/showthread.php

Desmond. K. (2010) *The future of learning: From E-learning to M-learning*. Available on line at http://learning.ericsson.net(2010)

75

Dahshan.J, Younis.J (2009) M- learning A New Form of Remote Learning. *.A research presented to the first scientific seminar of Education College titled "Hypothetical Higher Education Systems*, Kefir AL-Sheikh University, Egypt.

Faqeeh. A. (2009). *M-learning…A New vision by using wireless technology*. Available: Math – Nablus,y007.com/search. Forum.

Georgiev, T., Georgieva, E. & Smrikarov, A. (2004). *M-learning – A new stage of e-learning. Proceedings International Conference on Computer Systems and Technologies –CompSysTech',* 1-5. Retrieved February 2011 from http://ecet.ecs.ru.acad.bg/cst04/Docs/sIV/428.pdf

Ghazaw. A.M (2009). *M-learning…A New vision by using wireless technology*. Available: Math – Nablus,y007.com/search. Forum.

Hall, B. (1997)*. Web-based Training*. John Wiley & Sons, Inc., New York.

Hammami, M (2006). M-learning, a new stage of e- Learning, Information. *Magazine- Automation in leaning*, No.6, pp.70.

Hana M. Eltayeb Abdalla and Mohammed Osman Ali Hegazi. *Mobile phone: Portable Devices In Learning*. Ppt.

Harithi, M. A, "M-learning", A research at King Saud University, published in Riyadh Newspaper, 20/1/2008.

James Kadirire (2007) Instant Messaging for Creating Interactive and Collaborative M-learning Environments, *International Review of Research in Open and Distance Learning,* Volume 8, Number 2*.* June.

Jaiswal, D. (2012) New Approaches in Learning: E-learning, M-learning and U-learning. *Scholarly Research Journal for Interdisciplinary Studies*. Vol-1, Issue-II, Sept.

Jason G. Caudill, 'The Growth of m-learning and the Growth of Mobile Computing: Parallel developments', *The International Review of Research in Open and Distance Learning*, Vol. 8, No 2, 2007. From http://www.irrodl.org/index.php/irrodl/article/view/348/873 (last access: 08, November 2011).

Kaveh, Mohammed Hussain. *E-learning: Advantages and Disadvantages*.

Khmis.M. Attiyyah (2010). E-learning Systems and Technology, Retrieved. Eaat. Net/ ar/plugins/ content, php? Content 14.-(2010).

Kukulska-Hulme, A., & Traxler, J. (2005). *Mobile learning: A handbook for educators and trainers*. London: Routledge.

Kynaslathi, H (2003). In search of element of Mobility in the Context of Education. In Mobile Learning. pp.41-48.

Laurillaard, Diana (2002), *Rethinking University Teaching: A Conversational Framework for the Effective Use of Learning Technologies* (2nd edition) (London: Routledge Falmer).

Low, L. & O'Connell, M. (2006). Learner-centric design of digital mobile learning. OnlineLearning and Teaching Conference – OLT Conference 2006. 26 September, Brisbane,Australia. Retrieved March 15, 2011 from https://olt.qut.edu.au/udf/OLT2006/gen/static/papers/Low_OLT2006_paper.pdf

Moussa, A. A, E- learning: characteristics, Advantages, Obstacles. *A research paper presented to the forum of future school,, King Saud University,16-17/8/2010.*

Ong, C.S., Lai, J.Y., & Wang, Y. S. (2004). Factors Affecting Engineers' Acceptance of Asynchronous E-learning Systems in High-Tech Companies. *Information and Management*, 41 (6), 795-804, p.01.

Paul Resta*,* E-learning for Teacher Development: Building Capacity toward the Information Society.

Patil, V.N. & Sawale, A.N. (2012). M-learning: The Revolutionary E-Learning for Enhance Learning. In Nikose, R.L.(Ed.). *Teacher Education: Issues and Challenges*. New Delhi: APH Publishing Corporation.

Paliwal, S. and Sharma, K.K. Future Trend of Education – Mobile Learning Problems and Prospects.

Polsani, P. (2003). Network learning. In K. Nyinri k. (ed.) *Mobile Learning Essay on Philosophy, Psychology and Education*, Vienna: Passage vertaq, 2003 139-150, ISBN – 38511656032.

Pea, R., & Maldonado, H. (2006). WILD for learning: Interacting through new computing devices anytime, anywhere. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences* (pp. 427-441). Cambridge: Cambridge University Press.

Park, Yeonjeong (2011). A Pedagogical Framework for Mobile Learning: Categorizing Educational Applications of Mobile Technologies into Four Types, *The International Review of Research in Open and Distance Learning*, Vol.12, No.2, February. http://www.irrodl.org/index.php/irrodl/article/view/791/1699

Parsons, D., & Ryu, H. (2006). A framework for assessing the quality of mobile learning. *Massey University website.* Retrieved February 20, 2007 from: http://www.massey.ac.nz/~hryu/M-learning.pdf

Peters, K. (2007). M-learning: Positioning educators for a mobile, connected future. *International Journal Of Research in Open and Distance Learning, 8*(2), 1-17.

Quinn, C. (2000). M-learning: Mobile, Wireless and In-Your-Pocket Learning. *Line Zine*.

Romesh Verma (2007), E-learning Strategies in Teacher Education, *University News*, Vol 45 No.18 April.

Rosenberg, M. J. (2001) *E-learning Strategies for Delivering Knowledge in the Digital Age*, New York: McGraw-Hill.

Saleem, T.A. (2011). Mobile Learning: A New Step in E-learning. *Journal of Theoretical and Applied Information Technology*. Dec. Vol.34. No.2.

Shepherd C. (2001). M is for May be. Tactix: Training and Communication Technology in context. p.5.

Sharma, S.K. & Kitchens, F.L. (2004). Web services architecture for M-learning. *Electronic Journal on e-Learning, 2*(1), 203-216.

Sharples, M. (2005). Learning as conversation: Transforming education in the mobile age. *Proceedings Seeing Understanding, Learning in the Mobile Age,* Budapest, April 28-30,147-152. Retrieved January 2011 from http://www.eee.bham.ac.uk/sharplem/Papers/Theory%20of%20learning%20Budapest.pdf

Srisakdi Charmonman, and Natanicha Chorpothong (2005) Digital Lifestyleand the Road Ahead, Special Issue of *the International Journal of the Computer, the Internet and Management*. Vol.13 No.SP3, November.

Thaisit, P. and Jitgarun, K. (2006). Advantages and Disadvantages of m-Learning for University Students in Thailand, *APERA Conference, 28 – 30 November 2006 Hong Kong*.

Trifonova, A. (2003). Mobile learning – Review of the literature. *Technical Report DIT-03-009,Informatica e Telecomunicazioni, University of Trento*. Retrieved February 2011 from http://eprints.biblio.unitn.it/archive/00000359/01/009.pdf

 Traxler, J., (2005). Defining Mobile learning. *Proceedings IADIA International conference on mobile learning 2005*, Malta. Pp – 261-266. www.mlearning.org.20/cd/papers/Lauris%20 & 20% Eteokel pdf (retrieved on 17.08.2010).

Traxler, J. (2007). Defining, Discussing and Evaluating Mobile Learning: the Moving Finger Writes and having Written. *International Review of Research in Open and Distance Learning 8*(2).

Wagner, E. (2005). Enabling Mobile Learning. *EDUCAUSE review, 40*(3). May/June. Retrieved February 2011, from http://www.educause.edu/ir/library/pdf/erm0532.pdf

 Wentling, T. and Others (2000). *E-learning: A Review of Literature*. Retrieved from: http/learning.ncsa.uiuc.edu/papers/elearnlit.pdfdon Nov.2005.

www.mlearning.org.20/cd/papers/Lauris%20 & 20% Eteokel pdf (retrieved on 17.08.2010).

www.mlearn.org.za/CD/papers/Barker.pdf

www.slideshare.net/yash2/elearning, Feb 14,2012

http://mlearning.wikispaces.com/advantages

Yuhsun Edward Shih and Dennis Mills (2007) Setting the New Standard with Mobile Computing in Online Learning*, International Review of Research in Open and Distance Learning, Volume 8, Number 2.,* June.

ANALYSIS OF OP: 63 PIANO ETUDES BY LUIS STREABBOG WITH REGARDS TO TARGET BEHAVIOURS

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ABSTRACT

In this study, etudes in no op:63 piano etude method by Luis Streabbog have been determined with regards to target behaviors by using content analysis method. To what extent so-called method meets the target behaviors in undergraduate programs of music education departments set by Higher Education Institution has been studied. The outcomes of this study have proved that the method fits second year of undergraduate program. This study also aimed at introducing these etudes to the faculty of piano lecturers with regards to their target behaviors as this method is rarely known and involved at piano classes of music education departments. This study assumes great importance in that it enriches beginner level piano etude course books and turns out to be an alternative to these course books. As a result of this study, it has been seen that target behaviors –which performing legato, performing staccato, playing scales, playing cadences and musical dynamics- in undergraduate programs of music education departments set by Higher Education Institution, in accordance with etudes in no op:63 piano etude method by Luis Streabbog. In contrast with this results, it has been seen that target behaviors –which performing portato and using pedal- are not compatible etudes in no op:63 piano etude method by Luis Streabbog.

Key Words: Luis Streabbog, Etude, Piano Education, Piano Technique.

INTRODUCTION

"Piano is regarded as the most universal and essential instrument with respect to playing, listening to and singing the music; appreciating the music, forming music knowledge as well as with respect to setting basis for other music studies by music educators. Thus, piano education is an indispensible part of music education." (Buchanan, 1964:12). "Piano, without doubt, is the sole instrument with which polyphony in every type or intensity could be obtained and which has completed its evolution. That is the feature that places piano in educational and professional life of the music teacher with utmost supremacy. Once the essentials and relevant training of this instrument have been planned accordingly at music teaching, it will also improve music education in general." (Kıvrak, 2003:210). A candidate music teacher who has been raised with an informed and conscious piano education will have caught a serious opportunity in order to complement the basic skills and knowledge that s/he acquired during his/her university education and to make use of these strengths in his/her professional career. With great emphasis placed on piano at music education departments, educators as well as students are required to involve themselves in this instrument meticulously.

"To raise music teachers of future as piano experts has been a widely acknowledged issue at music teaching schools of Turkey. Piano classes are offered to all candidate music teachers at music teaching schools. Piano

79

classes ensure candidate teachers to be equipped with basic piano skills that they will need at classes from kindergarten to high school and that will also serve for their own music background." (Kasap, 2004:160). One of the most effective methods of acquiring advanced piano playing skills is to attain a certain technical capacity. "Technical practices clean nerve tracks so that the transition of voluntary impulses from motor center (brain cells) to playing organs would be quick and uninterrupted. Finger sensitivity should be sharpened and strengthened. It is called the sensitivity of internal linkage organs like muscle, bond and bone. They provide main stimulus which run the motor center."(Çimen, 1994:28). Student receiving instrument training will get the shape how s/he is advised technically. Every student is required to learn how to play an instrument by using an efficient technique. For the piano education to be instructed effectively and efficiently, relevant technical practices are supposed to done in a certain discipline regularly and accurately. Otherwise, playing an instrument will not be a discipline and will turn into a technical challenge that student has to wrestle with."(Çilden, 2003:297).

Etudes are the most crucial materials to improve the technique in piano education. Etudes are the practices that are introduced in every phase of piano education and a student has to study in order to get to a certain technical level. "Etude is the mature practice pieces that allow the playing technique to be improved in an expert level while it also attaches emphasis on musical quality."(Say, 2005:556). "Etudes involve dynamics that help technical and deciphering skills enhance and speed and sense of musicality improve. (Ercan, 1994:35).

"Etudes could be identified in two groups:
1. Etudes written to help students acquire basic piano attitudes like tones, measures, deciphering, basic techniques, ornamenting styles and technical components (practices).

2. Etudes written to help students acquire advanced technique and musicality. (Karahan, 2004:4).

Repertory of etudes in music education departments are largely made up of those identified in the first group. "Practicing etudes with training objectives has been proved beneficial in that etudes cover all challenges in music in a systematic manner and to see the whole pictures inspires the player an opportunity of experience." (Pamir, t.y.:130). That is why the target behavior is to be set explicitly while studying etudes and this behavior is to be studied in great detail. An etude played superficially with no emphasis on correct manners won't bring any good at all. "The student should bear in mind that an etude practice requires more rigor on fine details rather than quantity" (Pamir, no date:131). Thus, piano lecturers are required to choose etudes catering for the needs of the students, to be expert in the etude they are planning to introduce and to make sure the etudes overlap with the level of their students. Scarce number of etude methods introduced at piano classes of music teaching schools restricts the alternatives of etudes that the lecturers might offer their students. This study has enabled lecturers to be familiar with a different beginner level etude method and to make use of it.

Objective
This study aimed at determining target behaviors of etudes in no op:63 piano etude method by Luis Streabbog, which is rarely known and used in piano education, by using content analysis method as well as at investigating to what extent they meet the piano curriculum objectives of second year of undergraduate programs set by Higher Education Institution.

Significance
Considering the variety of the beginner level etude methods in piano education at music teaching schools, we note that a limited number of etude methods are being benefited and alternatives are ignored. With regards to this challenge, this study assumes great importance in that it enriches beginner level etude methods. Besides, this study, no op:63 piano etude method by Luis Streabbog, is the first study investigating to what extent they meet the piano curriculum objectives of second year of undergraduate programs set by Higher Education Institution.

METHOD

In this study, general survey model has been used to obtain data for purposes of setting the hypothetical framework. Content analysis, one of qualitative survey methods, has been used to determine target behaviors of 12 etudes in no op:63 piano etude method by Luis Streabbog. "In content analysis, similar data brought together around certain concepts and themes are organized and interpreted in a manner that the users can understand" (Şimşek H., Yıldırım A.,2000:162).

Universe and Sample

The universe of the study is the beginner level etude methods used in piano education while no op:63 piano etude method by Luis Streabbog is the sample of the study.

Analysis of Data

The data has been obtained through coding, identifying themes and organizing and grouping the data according to themes. The data has been presented in outcomes section under frequency distribution and themes with codes.

FINDINGS

Outcomes of the analysis of no op:63 piano etude method by Luis Streabbog have been grouped in five categories: musical dynamics, right-hand playing techniques, left-hand playing techniques, tonality-measure number-speed terms and harmonic structure. Additionally, to what extent the data overlap with the piano curriculum objectives of second year of undergraduate programs set by Higher Education Institution has been demonstrated in another category.

Table 1: Descriptive Distribution of Target Behaviors of Musical Dynamics that No Op:63 Piano Etude Method by Luis Streabbog involved

PURPOSE	PURPOSEFUL BEHAVIORS	ETUDES IN WHICH MUSICAL DYNAMICS	%
	Piano	1, 3, 4, 5, 6, 7, 8, 9, 10, 12	83
	Mezzo-forte	3,9,10	25
	Forte	1,2,5,7,10,11,12	58
	Fortisimmo	12	8
MUSICAL DYNAMICS	Crescendo	1,3,4,5,6,7,8,9,11	75
	De-crescendo	4,6,7,9,10	41
	Diminuendo	9	8
	Rallentanto	5,9	16
	Puandorg	3,5,7,9,10	41
	Accent	6,8,10,11	33

The outcomes demonstrate that 83% of piano, 25% of mezzo forte, 58% of forte, 8% of fortissimo and diminuendo, 75% of crescendo, 41% of de-crescendo and puandorg, 16% of rallentanto and 33% of accent are in use. In this case, it might be noted that the percentages of musical dynamics required to be introduced in beginner level piano etudes are comparatively bigger.

Table 2: Descriptive Distribution of Target Behaviors of Right-Hand Playing Techniques that No Op:63 Piano Etude Method by Luis Streabbog involved

PURPOSE	PURPOSEFUL BEHAVIORS	ETUDES IN WHICH RIGHT-HAND PLAYING TECHNIQUES	%
RIGHT-HAND PLAYING TECHNIQUES	Legato	1,4,5,6,7,9,10,11,12	75
	Staccato	3,8,11	25
	Bound Staccato	11	8
	Syncope Ligature	2,4,9,10	33
	Playing Trio Sound Chords	1,2,3,5,9,10,11	58
	Melody Move In Overlapping Sounds	10	8
	Legato Trio Parallels	9	8
	Technique Of Octave	8	8
	Technique Of Arpeggio	7	8
	Figuring The Chords	6	8
	Chromatic Movements	5	8
	1 Octave Scales	1	8
	Ornaments	4	8
	Dual Or Trio Sound (Chord) Staccato	3	8
	Playing Dual Sounds	3,4,9	25
	Thumb Pass	1,6	16

The outcomes demonstrate that 75% of legato, 25% of staccato and playing dual sounds, 8% of bound staccato, melody move in overlapping sounds, legato trio parallels, octave, arpeggio, figuring the chords, chromatic movements, 1 octave scales, ornaments and dual or trio sound (chord) staccato, 33% of syncope ligature, 58% of playing trio sound chords and 16% of thumb pass are in use. In this case, it might be noted that the percentages of target behaviors required to be introduced in beginner level piano etudes for right hand are comparatively bigger.

Table 3: Descriptive Distribution of Target Behaviors of Left-Hand Playing Techniques that No Op:63 Piano Etude Method by Luis Streabbog involved

PURPOSE	PURPOSEFUL BEHAVIORS	ETUDES IN WHICH LEFT-HAND PLAYING TECHNIQUES	%
LEFT-HAND PLAYING TECHNIQUES	Legato	4,7,10	25
	Staccato	10,11	16
	Legato Chord	1	8
	Syncope Ligature	1,3,4,5,8,9,10,11	66
	Playing Trio Chords	1,5,8,9,10,11,12	58
	Playing Dual Sounds	3,5,8,9	33
	Cross Transitions	6	8
	Technique Of Octave	9	8
	Technique Of Arpeggio	2,4,7	25
	Figuring The Chords	3,8,11,12	33
	1 Octave/ Scales In Interval In 5	1,2	16
	Thumb Pass	1	8

82

The outcomes demonstrate that 25% of legato and arpeggio, 16% of staccato and 1 octave/ scales in interval in 5, 8% of legato chord, cross transitions, octave and thumb pass, 66% of syncope ligature, 58% of playing trio chords, 33% of playing dual sounds and figuring the chords are in use. In this case, it might be noted that the percentages of target behaviors required to be introduced in beginner level piano etudes for right hand are comparatively bigger.

Table 4: Descriptive Distribution of Target Behaviors of Tonality-Measure Number-Speed Terms that No Op:63 Piano Etude Method by Luis Streabbog involved

PURPOSE	PURPOSEFUL BEHAVIORS	ETUDES IN WHICH TONALITY-MEASURE NUMBER-SPEED TERMS	%
TONALITY-MEASURE NUMBER-SPEED TERMS	C Major	1,2,4,6,8,12	50
	G Major	3,5,11	25
	F Major	7,9	16
	A Minor	10	8
	2/4	8,9,12	25
	4/4	1,2,6,7,10,11	50
	3/4	3,5	16
	6/8	4	8
	Allegro Vivace	12	8
	Allegretto	3,8,11	25
	Andante	4,6,10	25
	Allegro	2	8
	Adagio	9	8
	Allegro Moderato	1,7	16
	Allegro Grazioso	5	8

The outcomes demonstrate that 50% of C major, 25% of G major, 16% of F major and 8% of A minor are in use. In this case, it might be noted that the outcome overlaps with the tones required to be introduced in beginner level piano etudes.

The outcomes demonstrate that 25% of 2/4, 50% of 4/4, 16% of 3/4 and 8% of 6/8 are in use. In this case, it might be noted that the outcome overlaps with the measure numbers required to be introduced in beginner level piano etudes.

The outcomes demonstrate that 8% of Allegro vivace, , Allegro, Adagio and Allegro Grazioso, 25% of Andante and Allegretto, 16% of Allegro moderato are in use. In this case, it might be noted that the outcome overlaps with the speed terms required to be introduced in beginner level piano etudes.

Table 5: Descriptive Distribution of Target Behaviors of Harmonic Structure that No Op:63 Piano Etude Method by Luis Streabbog involved

PURPOSE	PURPOSEFUL BEHAVIORS	ETUDES IN WHICH HARMONİC STRUCTURE	%
HARMONIC STRUCTURE	1st Degree Major Chord	1,2,3,4,5,6,7,8,9,10,11,12	100
	1st Degree Minor Chord	10	8
	1st Degree Major Chord in 7	12	8
	1st Degree Aug-4 Chord	12	8
	2nd Degree Major Chord	2	8
	2nd Degree Major Chord in 7	4,5,8,9,11	41
	2nd Degree Minor Chord	8,11	16
	3rd Degree Major Chord	10	8
	3rd Degree Minor Chord	7	8
	3rd Degree Major Chord in 7	9	8
	4th Degree Major Chord	9,12	16
	4th Degree Minor Chord	9,10	16
	5th Degree Major Chord	2,4,7,9,11	41
	5th Degree Major Chord in 7	1,3,4,5,6,7,8,9,10,11,12	91
	6th Degree Minor Chord	7,8,9	25
	7th Degree Major Chord	7	8
	7th Degree Major Chord in 7	7,10	16

The outcomes demonstrate that 100% of 1st Degree Major Chord, 8% of 1st Degree Minor Chord, 1st Degree Major Chord in 7, 1st Degree Aug-4 Chord, 2nd Degree Major Chord, 3rd Degree Major Chord, 3rd Degree Minor Chord, 3rd Degree Major Chord in 7 and 7th Degree Major Chord, 41% of 2nd Degree Major Chord in 7 and 5th Degree Major Chord, 16% of 2nd Degree Minor Chord, 4th Degree Major Chord, 4th Degree Minor Chord and 7th Degree Major Chord in 7, 91% of 5th Degree Major Chord in 7 and 25% of 6th Degree Minor Chord are in use. In this case, it might be noted that the outcome overlaps with the cadence structures (I-V or I-V7) required to be introduced in beginner level piano etudes.

Table 6: Descriptive Distribution of Target Behaviors of Second Year of Undergraduate Programs Set by Higher Education Institution that No Op:63 Piano Etude Method by Luis Streabbog involved

TARGET BEHAVIORS OF SECOND YEAR OF UNDERGRADUATE PROGRAMS SET BY HIGHER EDUCATION INSTITUTION	ETUDES IN WHICH THESE TARGET BEHAVIOURS	%
Performing Legato	1,4,5,6,7,9,10,11,12	75
Performing Staccato	3,8,10,11	33
Playing Scales	1,2,5	25
Playing Cadences	1,2,3,4,5,6,7,8,9,10,11,12	100
Musical Dynamics	1,2,3,4,5,6,7,8,9,10,11,12	100
Performing Portato	-	-
Using Pedal	-	-

The outcomes demonstrate that 75% of legato, 33% of staccato, 25% playing the scales, 100% of playing cadences and musical dynamics are in use while use of portato and pedal is never mentioned. In this case, it might be noted that target behaviors of no op:63 piano etude method by Luis Streabbog overlap largely with the target behaviors of second year of undergraduate programs set by Higher Education Institution.

CONCLUSION

It has been noted that no op:63 piano etude method by Luis Streabbog:

1. largely involves musical dynamics (p,mf,f,cressendo,de-cressendo) required to be introduced in beginner level piano etudes,
2. largely involves right-hand playing techniques (legato, staccato, syncope ligature, legato playing of trio parallels, string, thumb pass, octave technique, arpeggio technique, playing dual or trio sounds, figuration) required to be introduced in beginner level piano etudes,
3. largely involves left-hand playing techniques (legato, staccato, syncope ligature, legato playing of trio parallels, string, thumb pass, octave technique, arpeggio technique, playing dual or trio sounds, figuration, cross transition) required to be introduced in beginner level piano etudes,
4. largely involves tonality, measure number and speed terms (1 accidental major tones, non-accidental minor tones, measures with simple times, speed terms between andante and allegro vivace) required to be introduced in beginner level piano etudes,
5. largely involves harmonic movements and cadences (I-V or I-V7) required to be introduced in beginner level piano etudes,
6. largely involves all target behaviors of second year of undergraduate programs set by Higher Education Institution except for "portato and pedal technique".

All in all, this study has demonstrated that no op:63 piano etude method by Luis Streabbog could replace the limited number of piano etude course books followed at second year of music teaching departments or be used as a supplementary material to these course books in accordance with the piano course content and objectives set by Higher Education Institution.

IJONTE's Note: This article was presented at 4th International Conference on New Trends in Education and Their Implications - ICONTE, 25-27 April, 2013, Antalya-Turkey and was selected for publication for Volume 4 Number 2 of IJONTE 2013 by IJONTE Scientific Committee.

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REFERENCES

Buchanan, G. (1964). Skills of piano performance in the preparation of music educators. *Journal of Research in Music Education.* 134-138.

Çilden, Ş. (2003). Çalgı eğitiminde nitelik sorunları. Cumhuriyetimizin 80. Yılında Müzik Sempozyumu Bildiriler Kitabı. (297-302).

Çimen, G. (1994). Piyano eğitiminde bireysel çalışma süreci. Gazi Eğitim Fakültesi Dergisi, Musiki Muallim Mektebi'nin Kuruluşunun 70. Yılı Özel Sayısı. 137-142.

Ercan, N. (1994). Piyano eğitiminde etüt çalışmaları ve alıştırmalar. Orkestra Dergisi. Temmuz Sayısı. 34-39.

Karahan, A. (2004). Türkiye'de müzik öğretmeni yetiştiren kurumların piyano öğretimi sürecinde kullanılan Klasik Batı Müziği piyano etütlerinin öğrencileri Çağdaş Türk Müziği piyano eserlerini çalmaya hazırlama durumu. Yayımlanmamış yüksek lisans tezi. Gazi üniversitesi, Eğitim Bilimleri Enstitüsü. Ankara.

Kasap, T. B. (2004). Müzik öğretmeni yetiştiren kurumlardaki yardımcı çalgı piyano dersleri üzerine bir araştırma. *1924-2004 Musiki Muallim Mektebinden Günümüze Müzik Öğretmeni Yetiştirme Sempozyumu Bildiriler Kitabı.* (160-165).

Kıvrak, N. İ. (2003). Müzik öğretmeni yetiştirmede piyano eğitimi. Cumhuriyetimizin 80. Yılında Müzik Sempozyumu Bildiriler Kitabı. (209-211).

Pamir, L. (no date). Çağdaş piyano eğitimi. İstanbul: Beyaz Köşk(Müzik Sarayı) Yayınları.

Say, A. (2005). Müzik ansiklopedisi. *Etüt* (Cilt:1, s.506) *.* Ankara: Müzik Ansiklopedisi Yayınları.

Şimşek, H. ve Yıldırım, A. (2000). *Sosyal bilimlerde nitel araştırma yöntemleri.* Ankara: Seçkin Yayıncılık.

THE OPINIONS OF THE ACADEMICIONS REGARDING TO PIANO EDUCATION

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ABSTRACT

Piano education, an instrument recognized all over the world, and music education departments compulsory education is taught in this course. Because a student of piano education polyphony grip, sight-reading skills development, training to run the hearing, harmony is considered as an opportunity for improvement in many areas of work, and so on.

This research studied piano lesson music education department faculty members who have experience in solving problems and is thought to be important in terms of minimizing the problems. Selcuk University Faculty of Education the current state of music education in the department of piano education is being given? sentence of the problem have been developed with the support of movement of the problems that emerged from the study. This research is a descriptive model of the research is carried out using literature review and interviews. Given the qualitative approach is used to collect the data Selcuk University, working in the music section was collected through interviews with six faculty member. The data obtained were analyzed and coded using content analysis method. Thus, the case should have been identified and have been identified existing condition. Consistency and contradictions between the existing and the case should be determined and agreed specific results, including some suggestions for the elimination of situations that are missing.

Key Words: Music, Music Education, Piano Education.

INTRODUCTION

Piano education, musical education refers to one of the lower branches. Piano teaching, practical and theoretical aspects of the whole. In order to achieve the current level of learning and teaching in the lessons, practice and theoretical fields at the same time support each other as needed (Kahramansoy, 2006:13).

Piano education, instrument training all around the world considered to be accepted. In our country, piano instruction, fine arts schools, music, fine arts departments, public and private conservatories, universities, faculties of education on the part of the fine arts, music teacher education departments, carried out through private lessons and music classrooms.

Piano education, reasons for use of the above-mentioned institutions are mandatory. These reasons include: (Kutluk, 1996: 4).
1. A person playing the piano voices in one-grip, sight reading, musical hearing, harmony, form, music is very important areas in terms of development, such as the ability to find information.

87

2. Piano solo instrument as well as a self-contained, accompanied by the sounds of other instruments, or used to make people have a companion educational musical instrument increases the importance of teaching.

Piano, music education is taught as a compulsory subject departments and institutions in the definition of piano education course "Piano education and training program forms the basis of a music teacher." As the pass. (Bradley, 2004). Piano music teacher education institutions are grown is located under the instrument training. Studied piano in educational programs since 1988, first as a 1, 2, and 3 took part in two hours of classes per week. However, since 2006, 4 class also been studied piano and programmed as 1 hour per week. These piano training institutions form the basis of teaching in music.

Piano, music education: Audio line width, due to the consistency of sound due to the hard walls can easily benefit from, ear training, development of a sense of very loud, rich literature, comfortable, able to accompany the ability of the student enjoyed the training facility has been due to the provision of the most preferred instrument. (Yönetken, 1996: p.69).

For these reasons, piano, musical instrument consisting of education is an important area, accompanied by the school's music can be made available for comfortable and convenient carrying and the ability to be regarded as the most suitable instrument.

Piano, music educators have an important role in educating. Music educators raising the basic functions are:
- Basic music knowledge and skills,
- Students apply the solo instruments an accompaniment,
- Student choirs build infrastructure,
- Type of music, literature, varieties, forms to inform,
- Acquire the habit of listening to music (Özen, 1998: 29).

There are techniques that are essential in teaching piano. These are the most basic techniques used by an instructor teaching piano: piano movements and weight control, overall body posture and hand position, practical, acquisition and touch tone, tempo, metronome, rhythm, dynamics, articulation, pedal using a number of techniques, chord, and arpeggios (Agay, 1981: 11 -19).

Learning the piano is basically a very complex and multifaceted process. Piano teaching, the mind, the body, vision, hearing, reading notes, detection and so on. Such actions are intertwined.

Piano is very important to start training. Piano music departments of the faculties of education adult education. The first thing needed here is an "adult" is not a word to better understand and implement appropriate training. Children's education is more difficult than training the most important factor for the training of adult piano "patience" is. For the successful achievement of the purpose of piano education student's love this job, playing the piano lesson at the request must come.

Piano teachers in adult education, have to keep in mind that many psychological factors. Some adults playing the piano and the piano are often difficult for people who are motivated and behaviors often exhibit a negative idea. Musical education in piano skills often works in the background and may not want to throw. Therefore, teachers must ensure that their experience success in giving psychological support to use. If you cannot provide this success will not reach the target to be studied piano (Agay, 1981: 253).

Adult education is important, the teacher approach. Educators who want to learn the piano at an early age is very eager to write, but psycho - motor development may be encountered with the student model is not suitable to play the piano. Faced with this model piano educator, student, piano and musical terms may be insufficient to transfer. However, the following should be noted that the teacher, the student's resolve to wish the need to find appropriate teaching techniques, students should approach exhibiting positive behavior. Adult students have a tendency to ask a lot of questions because of their age piano or music education. Teacher, do

88

them answerable, both physically and psychologically ready to participate in the course as Occurrence (Newman, 1984: 25).

Leisure time than ever for a lot of people would like to piano lessons. Do not run with the nature of these people, a professional student of music education, music students will gain general be given behavior. Therefore, a music teacher, both general and special, as well as professional a person must have the capacity to provide training.

Initially, adult piano students in general, are not developed in terms of rapidity finger. Also more limited capabilities than children. In terms of detection of vision, hearing and reading is faster than the forces of adult education, the learning styles of piano, giving more weight foreseen (Bastien, 1973: 13 -14).

Problem Statement

Piano, music teacher departments are seen as the main instrument. Students as teachers of music sound, ear and body to control and develop education. So the piano, can meet all of these developments due to be regarded as the most important professional instrument.

"In this context, training in the fine arts faculty of education on the part of the piano music teacher candidates studying at the department of music teacher education is important to use the acquired knowledge and skills in accordance with the requirements of a music teacher" (Yılmaz, 2005: 8).

Music teacher education department of fine arts faculty of education departments on the 1996 - 1997 academic years, the program was administered from the public. According to this program, six were given piano instruction period. Accordingly 4 There were piano lessons in the classroom. However, the period since 2006, studied piano and removed 7, 8 period programmed as the piano and teaching. Thus, the music department students are provided the opportunity to receive training in piano for 4 years.

Use students' future professional lives studying music department is the main instrument, the piano, and solving the existing problems students face in terms of minimizing the importance of this research.

Selcuk University, Faculty of Education, Department of Fine Arts, and Department of Music Education is given the current state of education in the piano?

This problem required the teaching of sentence on the basis of expert opinions on the piano faculty members were asked to fill in the interview. Determining the level of students in this forum, the adequacy of hours of piano lessons, piano room, and the adequacy of working conditions, extra-curricular activities and productive piano lessons piano skills to the solution of what is discussed.

Importance of Research

This research, Selcuk University, Faculty of Education, Department of Fine Arts, Department of Music Education studied piano at the Music Education Department at 1, 2 and 3 grade students to determine the factors that affect positively or negatively the achievements piano education, work environments and quality pianos status, the relationship between the instructor and students, is intended to determine the status of students' attitudes towards and motivation.

Selcuk University, Department of Music students in this research and the teaching staff to reveal his understanding of problems and solutions for these problems are important.

METHOD

This research is a descriptive research, literature review and interviews carried out using the model. Collecting the data given in the qualitative approach. Qualitative data were collected through interviews with faculty members working in the institution. Interview data was analyzed and coded using content analysis method. Thus, the situation has been found to be identified and existing condition. Consistency and contradictions

89

between the states which have to be determined, suggestions have been made for the elimination of situations that are missing.

The data required for this research, collection of resources on this topic and piano instructors are analyzed and applied to the coding of the answers given were obtained by interview. Literature review, research and institutional basis to determine the basic facts on which to base monitored as a technique applied to create. Interview form, designed for the working group, and an example of an open-ended question, an example of closed-ended questions, descriptive questions and hypothetical questions sample consisted of sample types. Interview, the purpose and duration of this study, Selcuk University Faculty of Education at the Department of Fine Arts faculty members who served six piano lessons were applied in order to obtain the necessary data in order to determine their views. Piano teaching piano education faculty members prepared for the meeting a positive or negative effect on students' achievement to get their views on the fundamental factors applied.

RESULTS AND INTERPRETATION

1 - The criteria applied to determine the level of student for strategies

Code: Level to determine the significance (6), Readiness (6), to determine technical errors (6), literature study (6), missing training (4), the trial and error method (4). Working methods (3), physical fitness (1), and ear training (1).

A faculty member teaching staff participated in the research, stressed that determines the level of students started studying the piano. In determining the level of the students received training in how many years the student to ask, if you have already been playing a work by listening to him, seeing the shortcomings, if there is no dearth to continue to provide the student where the level. If students have come straight from high school, and if there is no readiness basic techniques are expected to start studying the piano.

B faculty members participated in the study, teaching staff, and students stressed the need to determine the level do. To determine the student's level of listening to it if you have already been playing a piece. Pre-piano training took part of several attempts by the students try to determine the level.

C faculty members participated in the study, teaching staff, students determine levels. In order to determine the student's level determines whether the student previously studied piano. Students do not have any music education at judging whether there is a problem physically before, then on the ear training is working. Pre-piano education students by examining the work that they have done before, and to what level the playing pieces that have previously entered the exam notes, learn piano. After this operation, a piece of playing piano student wants to work with him again. Has been playing in student work from start to finish after listening carefully and working to determine the technical errors trying to reach a judgment about the student's musicality. Piano student across the physical posture, arm weight, balance and comfort of a good measure to determine the level of the students stressed. How to decipher a small work pieces, giving the student the student acquires insight as to the method.

D faculty members participated in the study, teaching staff, student determines the level. Worked in the last year to determine the level that the student wants a list of the works and the surveys. The behavior of many technical studies and a host in the list by selecting a work of baroque wants to prepare for the next class. Baroque works or studies that are available do not meet the required criteria listed in the list of studies and works on the basis of estimated level selects for. Was chosen to study and without interfering in any way in the preparation phase of the work the student did not make or what are you trying to understand what they had seen. After these stages, the instructor determines the level of the student to understand the accumulation of literally advocating for one month trial period.

E faculty members participated in the study, teaching staff, students stressed that determines the level. In order to determine the level of works executed before the student asks what it is. After listening to the work

90

that the student had worked previously worked close to the level of the work requires the operation of a study. After hearing given to the study of the technical behavior gained so far, the program determines by ready.

F faculty members participated in the study, teaching staff, and students started studying the piano at the level of sets. The evidence given by a number of studies of the first 30 in line with the student's study by Czerny. The aim of study which did not play stealing, but to what extents have the technical behavior, whether it is expressed in these behaviors settled how to sit. If you are a student at a particular level piano album continues to observe the behavior of single-page technical easy parts. After determination of the level sets a specific curriculum in this direction. Operating in accordance with the level where level is a good level of work of the students would like to repeat. This kind of group of students while at the Sonata direct support to the works of Schumann, or is Mendelsohn.

2 - Piano lesson hours per week on the strategies
Code: Student absences (6), the adequacy of class hours (6), lack of teaching staff (6), the control difficulty (6), careful study (6), lack of time (5), to establish the discipline (5), the conscious study (5), the number of instrument failure (4), psychological factors (4), the development process misbehavior (4).

A faculty members participated in the study noted that piano lessons 1 hour per week are not enough. A piano is a very special instrument, indicating that the students are not at home and around the piano playing panicky fear of failure works has stated that it has found. It started as a lecturer for 3 hours by the piano education should be reduced to two hours later. Thus, be given better advocates of basic techniques.

B faculty members participated in the study said that piano lessons 1 hour per week are not enough. This is because when there are 1 hour per week course that makes a student absent more than a week, the student teacher is a two-week-seen, is of the opinion that impede the development process so that the instructor of the course to be two hours a week, it will contribute a discipline of the highlights for the student.

C faculty members participated in the study, at least two hours of piano lessons should be said that the standard for the students. 40 minutes per week that the student is a very poor standard due to lack of teaching staff in dealing with difficult students emphasized that in 40 minutes 2. The initiation of the initial two-hour piano lessons, piano work habits once you understand the method and the one-hour piano lessons can be said enough.

D faculty members participated in the study stated that there is insufficient time of piano lessons. Conscious work habits was unable to obtain follow-up piano lessons students have one hour per week, submitted that she was extremely poor in terms of monitoring. The student has made 1 week absent, the interval between the two piano lessons to 15 days from their students on their own terms, thus causing loss of control over stressed. As a result of this absence of a long time in front of the student so that other piano lesson given by the comfort of knowing what to defer its work until the last moment was unable to yield a psychology courses are taken in and in doing so stated. This piano lessons two hours a week should be based on the instructor.

E faculty members participated in the study, each lesson piano lesson to a student's regular employees by making careful and meticulous study may be sufficient in the case argued that the first time. However, the opinion in this case, this can be a standard way of teaching staff, plus the number of hours students having more control over the rapid progress in a short time, the opinion may be.

F faculty members participated in the study, the number of students with an excess of one hour piano lessons be argued that a good result in terms of the student. Previous studied piano with 2 hours of curriculum, the students twice a week is better in terms of monitoring the state of development at the same time emphasized. Current training is given as a 1-hour program, the student 15 days due to absenteeism, thus stated that hampered the development of the piano.

3 - Number of piano, piano skills, and working rooms of the department mentioned on strategies

Code: Operation lack of maintenance of rooms (6), the room temperature failure (6), students' reluctance to work (6), Work opportunities restriction (6), lack of maintenance of pianos (6), psychological factors (5), the lack of working hours (5), Piano An insufficient number of (4) Motivation (3) Awareness (2).

A faculty members participated in the study, the school does not find sufficient number of piano. Student work as much as possible in terms of the number of piano could be better said. Thus, finding plenty of opportunity to study stated that they could ready for class. A maintenance-free, indicating that the rooms, especially the work of providing efficient cleaning of the room temperature and the room was likely.

B faculty members participated in the study, of the opinion that sufficient number of piano. Understanding of the student who wants to work can find every opportunity to work defending B, piano room care, the piano is more important than the number of the working environment in terms of psychology emphasized the importance of students.

C faculty members participated in the study, the number of school piano sufficient. Besides the idea that the piano is more than enough to contribute a fastness stated that work. Piano is adequate but the number of hours of work that lasts until late than C, working hours 20:30 until 17:00 in the evening but stressed the need to continue. C, which is of the opinion that the appropriate qualifications pianos, piano student clean, accurate, to the suggestion does not use, so use pianos stated life. To do this, to educate students how to comprehend emphasized the need for students to be used.

D faculty members participated in the study, work, or play the piano, the action of the mind is a process which is entirely possible participation, so it is no factor in the study was conducted in the absence of the students emphasized the need for a negative stimulus. D finds insufficient number of piano, a piano out of tune and broken keys, dirty, cold and room acoustics distorted study indicated that negatively affects the student's motivation.

E faculty members participated in the study, the number of school piano sufficient. However, the general condition of the school stated that the negative effects of students' work in terms of cleaning and maintenance.

F surveyed faculty members at the school, but the number of people falling piano, finding sufficient number of hours of work argues that there should be more. The current situation is provided to each student the opportunity to work 4 hours a week said F, more than you need to work late or very early hours of the students at the school who can make the work of the opinion states. Operating rooms, maintenance, cleaning, heat, insulation, lighting, maintenance of pianos in addition to this, the key is very important in terms of regulation and tuning regularity of the opinion that the student. So taking cares of the room, temperature, and defends the idea that cleanliness is of paramount importance.

4 - The strategies related to extracurricular activities

Code: Time constraints (6), activity limitation (6), Student reluctance (6), the excess burden of course (4), repeating-based studies (4), the intensity of academic study (4), the general cultural studies (2).

A faculty members participated in the study, the institution cannot charge for his work to help students outside of class. Students do not have time to do extracurricular activities, and plenty of opportunities to go to concerts by the students to listen to cd recommends. When students work as long as the student works in the piano class composers are given information about the facts and general culture.

B faculty members participated in the study stated that outside of class time to help students. Works, or to ask for something other than playing your lessons to help the students indicating that B, it cannot do any other activity emphasized.

92

C faculty members participated in the study, emphasized that help students outside of class. C, especially the coordination remains weak students have to do repetitive work. These studies, except for four-hand works with students working in C, not concert this work because it is not stressed. Piano concert programs to help students who do not fight for a particular instrument, due to their seeing the concert emphasized that they do not want to do.

D faculty members participated in the study, said that the course load and been unable to help due to the extent desired. Standard on the course the student is interested in and runs in to help the students stated withhold.

E faculty members participated in the study, because it is the period of the thesis stated that students could not allocate the time required outside of class. Y indicates that a lot of extracurricular activities, most of the time the students back to playing your work, stressed that running.

F faculty members participated in the study, except of course a kind of cannot resolve, or coordination of places from which to help students stated that passages. Course breaks, all the students in the evening a little help with their student or the F, apart from these, harmony, orchestration, or help students emphasized that the issues of popular music.

5 - With the expectations of the lecturers on the course, the student's strategies piano

Code: Piano lesson liking (6), the bidder study (6), adequate study (6), course attendance (6), Readiness (6), Occupational aggregation (6), the correct method (4), Education behaviors (4) , Knowledge transfer (4), a sense of responsibility (4), researchers and people carrier (3), Piano culture (2), polyphonic music, love (2),

Surveyed faculty members, students waiting for work and willing to love piano lesson. Due to a lot of problems at the application states that the students want to work more.

B faculty members participated in the study; students come to class prepared to continuously and, expect to pay attention to the warnings. Stressing the importance of continuity in class B, the work requires the right method.

C surveyed faculty members, students, stolen works of students of the future teacher to share his life, waiting for them to be a good companion and a good instructor. Piano students who want to be in the future educator who wants to be a good educational C, piano understanding of the culture and literature, music, culture, improve their pending. Very loud music to love and wants to make this work with pleasure.

D faculty members participated in the study, playing the piano, and his musical understanding how important it is waiting for gaining professional knowledge. Then the next steps for the student understand it will not be very difficult emphasizing D successfully completing this work has emphasized hard work. D of the expectations, piano music lessons other easily transfer their savings gained everything, teacher, researcher and waiting to be argumentative, regular work habits and gain conscious, they have learned a work, without the need to tell the teacher transfer works and can keep trying to work the works of other composers of the period, and is to have an idea about.

E faculty members participated in the study, the students' regular working class ready and waiting for them to come. However, looking to the work of the previous lesson to the notes E, to be responsible for the students to other classes, piano believes that this responsibility.

F surveyed faculty members, students waiting for enough work the first time. Certain level students who want to work and good work to read the correct note F, the better to master level students in the music and the work of a good part of the so-called phenomenon indicated that it wishes to contemplate.

93

6 - Piano concerts strategies for

Code: Concert deficiency (6), the scarcity of concerts in Section (6), student failure (5), Lecture program intensity (4), the lack of potential (4), Negligence (2).

A faculty members participated in the study noted that the school the student attended piano recitals. The reason for this is not the best student grown, so has not emphasized a concert.

B faculty members participated in the study noted that the school the student attended piano recitals. Best student section showed their concerts, piano recitals stressed that the success of individual students.

C faculty members participated in the study, student participation in school concerts of piano is not stated. Indicate the reason for this is the pace of the work required of the student, he was very busy because of the curriculum that emphasized the concerts could not allocate an extra working time.

D faculty members participated in the study, preparing students for the last two years, but the last two years until the end of year concerts for piano and academic studies of their own to take the time noted that this issue had neglected.

Faculty members participated in the study; from the moment the concert activities not conducted a concert at the potential of a student does not comply with the stated reason for this.

F faculty members participated in the study, concerts, events you want to edit, but it stated that. F indicates that the cause of intensive program, students also emphasized that working more for the concert.

7 - Efficient strategies mentioned on a piano lesson

Code: Student quality (6), Concert editing (6), the understanding of the discipline (6), basic music education (5), Fast decipher (5), the placement (5), to determine criteria (5), decisions of the Council (4) , the intensity of the program (4), the excess burden of course (4), the common point of view (4), Orientation (4) Operating hours (4), Individual lessons (3), Music culture (2), technological tools (1).

Faculty members participated in the survey, more efficient, better to take a piano lesson, student's basic music education, waiting for them to decipher the works faster than the effort. Spending time with a certain equality of the piano literature lecturers Hashes, recommends them to take decisions in order to overcome the shortcomings of making meetings.

B faculty members participated in the study, chapter sends students a wide variety of fine arts high school level, a level not be achieved correctly stated that due to the arrival of students. Use and abuse of students who think that this situation B, the level of the fine arts high schools students except by properly considering the problem will continue. B, section input ability tests required to be kept piano, so that stressed a certain level can be kept.

C faculty members participated in the study believes that the courses would help in eliminating defects in the making of a single person. Piano aptitude test to determine the level programs and want to make the rearrangement of C, as well as piano lessons with Anatolian Fine Arts High School has emphasized the need to be more qualified. Concerts or recordings to DVD with period features and stolen works of students would like to investigate.

D faculty members participated in the study emphasized the need for reducing the burden of the course of the teaching staff as a priority. Processing of a common perspective of the lecturers of the course, taking into account lessons should be determined according to the criteria that the public says. To encourage students to spend more time in school, says D is a factor to increase the success of teaching staff, aims to increase

students' self-confidence in front of them and transpose them say that will make you happy. This requires regular intervals during the organization of concerts.

E faculty members participated in the survey, more efficient teaching staff absences for a piano lesson retention schedule are self-discipline, and the students emphasized the classes regularly so that they can be kept in this table. Expectations for the course until the time of the students come to class regularly given them to do the work proposed.

F faculty members participated in the study, for all classes of more specific levels, creating a specific program, starting with the piano, it would be possible to think that by encouraging students to work harder. For this to be more than the number of piano, require more hours of work to be emphasized those improvements. Other than that, from time to time review of teaching methods and techniques of teaching staff requesting F, is how to decipher the student from time to time, to give seminars on topics such as How to assess a piano requires working hours.

8 - Imperfections cleared on the working efficiency of the strategies
Code: Operation deficiency (6), working conditions (6), the efficiency of working hours (5), a sense of responsibility (5), Success and development (4) Motivation (3).

A faculty members participated in the study, believes that the negative impact success. This assumes that you can add up to success in the negative is resolved.

B faculty members participated in the study will not change the student's success in case of failure to work more stressed. So I said drawbacks can be solved by working students.

C faculty members participated in the study, highlighting the importance of working hours the student wants to use it efficiently working hours. C may be individual differences among students who stressed the importance of keeping students' motivation and desire to survive. Piano teacher, coach, student, such as C, which is thought to be a student of the opinion presenting a very good recognition and working conditions.

D faculty members participated in the study, on the elimination of all negative believes that success. To what extent increases student motivation, success, will he or she considers degree.

E faculty members participated in the study, believes that could change the negative is removed. E indicates the first step is the responsibility of the student, the student's work considers catch line success.

F faculty members participated in the study, in which case the hold be found only necessary to be emphasized that the student's work. However, decrease in the number of students said that working in the event of removal of the negative. Improving conditions for the student to be interested in playing the piano and say it will take pleasure chanter, F, in this case, can be seen a considerable increase in the number of students eager to believe that works.

9 - Piano lesson about the criteria used to determine the grade of the strategies
Code: Number of Author (6), regular work (6), absenteeism schedule (6), the right work equipment (5), basic techniques (5), Readiness (5), musicality (4), Road to fold (3), Author of period features (3).

Faculty members participated in the study, the behavior of students in the next grade in determining the correct techniques for assessing the work. A success-minded behavior affects the student's course more, coming to the class to come up with methods to use such forms of behavior that the said criteria.

B surveyed faculty members, students, not counting towards determining the right notes, study techniques, and moral articulations, finger numbers, such as making a nice nuance is important criteria. Students in these

95

criteria with the number of tracks played during the period B, student attendance, take into consideration factors such as coming to class prepared. B, and notes before the exam is to remind students of these criteria.

C faculty members participated in the study, determining the classes regularly and trying to come up exam grade students a lesson, correcting previous errors come up, and have passed successfully through the period of the road to be taken seriously. In addition, posture, tempo, rhythm, sound, bonding and so on. That there are basic techniques, such as the C is wrong, students self-confidence, I cannot recommend suspicion.

D faculty members participated in the study, mid-term and final exams determine the criteria stated separately. X visa, sitting exams, hand and body position, he played in the work of technical behavior, tempo, period features and musicality absorb how they feel, the integrity of the work and not doing work during the period features such as regular use as a benchmark. D, while the final exam, midterm exam criteria used in the next class attendance, and nuance in pieces, and pays attention to the properties, introducing adopt.

E faculty members participated in the study, primarily in determining the semester grade students in the behavior of the expected acquisition and application of basic technical work pending. Who care about the integrity of the work, however, from the character of the work piece and the tempo indicated that the appropriate play importance.

F faculty members participated in the study, the student's work to understand the criteria before performing continuity or integrity in the musical, said that the main emphasis on the technical and musical acts. Unit beats the feeling, such as playing the right note and weighing emphasis on the basic techniques of F, the continuation of the student and how this instrument lays said that the time allocated between the criteria.

10 - The strategies related to the courses of the teaching staff
Code: Lecturer excess (5), the excess burden of course (4), Academic studies (4), social life (2), Technological classes (1).

A faculty members participated in the study, due to the performance of 20 hours per week did not prevent the burden. A course load that is too heavy for other teaching staff, experts in the field of elements should be emphasized that the piano.

B faculty members participated in the study noted that affected the performance due to the 20 hours per week program. Due to impair the performance brought a suggestion.

C faculty members participated in the study, the course certainly affects the performance of load states. C which experts in the field to take piano instructor, as well as classes in technology have made the course requires headphones.

D faculty members participated in the research, teaching load is affected due to the stated performance. D is a reasonable course load to land a number of new faculty members that it would be the only solution is taking.
Faculty members participated in the study, from 32 hours per week, and the performance of the burden has fallen excessively stated. Both complain about his lack of academic study as well as the time course load, but the E, the instructor recommends the adoption.

F faculty members participated in the study, the performance of every aspect of the weekly course load falls stated that due to fatigue is brought. When the intensity of the students in the week, friends and social life of the business reflects the F, recommends the adoption of new teaching staff.

11 - Piano lessons on school songs to accompany and decipher the strategies to increase of the power
Code: Fast decipher (6), basic techniques (6), practicality of winning (6), the accumulation of Harmony (5), Willingness (5), Easy playback studies (4), the usability profession (4), kinesthetic skills (4),

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International Journal on New Trends in Education and Their Implications
July 2013 Volume: 4 Issue: 3 Article: 10 ISSN 1309-6249

A faculty members participated in the study, believes that improved skills accompanied by piano lessons. Accompanied by surveys indicating that the ability to help Easy A, at the end of the course must have done the work to decipher, contributed to the ability of these studies indicated that accompany.

B faculty members participated in the study, accompanied by piano students who do well in the education of the opinion that a good proportion. However, the accompanying course, not with studied piano, harmony knowledge regarding the extent of saying the same B, the students emphasized that it is unable to merge the two areas.

C faculty members participated in the study, accompanied by piano lessons and a good Transcripts affect the ability to provide the convenience of the school considers parts. Intelligence theory and practical application of the student should be the best C, associated consumables highlights the fact that making a lot of importance in teaching.

D faculty members participated in the study believes that improves the ability of the piano accompanied by education. D needs to be done to develop this skill are primarily expressed as:
Simple forms of school songs, a good way to understand the level of knowledge and sight, part traffic, increase the power of the harmonic structures to predict, and therefore increase the speed to decipher. Harmonic structure of the piece to be equipped to easily understand and apply the rate increase to decipher. Piano lessons learned technical savings, ease of parts will make a feint, and therefore increase the speed to decipher.
E faculty members participated in the study, accompanied by piano and an ability believed that the power of education to decipher. E, primarily in gaining the necessary psychomotor skills, speed reading notes, which is a central element to the piano for two-hand coordination skills gained accompanied think. However, knowledge of theory and harmony will contribute to the ability to accompany said.

F faculty members participated in the study, piano lesson, the student must decipher the strength of said increase. Czerny etudes or Sonata stole example and, of course, it is possible to learn to work in harmony and accompaniment styles that says F, or curiosity, or an observation of the students in this direction cannot be said that it's possible. In addition, to increase the weekly course hours demanding course is accompanied by piano, F, piano education they have received the opportunity to apply can be found via this course discusses the basic techniques.

12 - Student success strategies listed on the core issues that adversely effect of the status
Code: Playing the insufficiency of the conditions (6), the lack of class hours (6), Indifference (6), Level detection (5), lack of motivation (5), Capability limitation (4), Perception limitation (4) , the excess burden of course (4), the understanding of the discipline (4), an excess of tolerance (3), Dialog (1).

A faculty members participated in the study noted that all the negativity from not only the student performance.

B faculty members participated in the study, the main problems that adversely affect the status of success at work, the ability to be more tolerance and perception of the teaching staff and the lists limitations.

C faculty members participated in the study, the key issues that adversely affect the status of success; AGSL levels of students coming from not knowing what exactly the students' reluctance, do not want to slog, the physical structure of the school, have a lot of concerts, don'ts, and the lists.

D faculty members participated in the study, the key issues that adversely affect the status of success, working conditions, failure, piano shortages, course hours to 1 hour per week, lack of motivation, and the ranks of the teaching staff to be more course load.

E faculty members participated in the study, the key issues that adversely affect achievement, piano lesson student discipline is reflected in other courses, the physical conditions, lack of teaching staff and student lists as the absence of work habits.

F faculty members participated in the study, the key issues that adversely affect the status of success; education course element in the dialogue between students, faculty member state, and the movement is very important, especially attitudes, inadequate number of teaching staff, the methods.

CONCLUSIONS AND RECOMMENDATIONS

In this section, which is defined in the previous section, depending on the findings and interpretations developed in line with the results obtained and the results obtained are given suggestions.

Selcuk University, Faculty of Education, Department of Fine Arts, Department of Music Education Piano education teaching staff was interviewed. Piano positive education - in order to determine the adverse effects of this research, music education, evaluation of the piano lessons, piano, and after that to bring innovations in education are thought to be important in terms of shedding light on the future studies.

According to the opinions of the teaching staff, the piano faculty members, largely determines the level of students started studying the piano. Determining the level of the student, piano lessons show was a productive start.

Piano lesson is one hour a week, it was not sufficient for the acquisition of knowledge and skills required for the course.

While piano lessons program faculty, student comments were largely taken into account. Develop students' motivation to take the opinion.

Piano evaluation criteria used to determine the student's course grade, indicating that very little information. The organization does not meet the identified needs in terms of quality and quantity pianos.

Lack of piano study rooms in the institution qualifies negatively affect student motivation.

Extra-curricular education of students in piano teaching staff during the "very low" benefit has been determined. Agreement between a piano lesson instructor and student success factors "totally" are affected.

Concerts of piano section were found to be very little. Even if a lot can be said that student participation piano music.

Piano lessons about the works studied in research, carried out partly to take account of period features.

Looking at the results of this study, the piano lessons piano education criteria given in music education, is understood not reach the desired level.

According to the opinions of the teaching staff in general education in piano is inferred to have a negative nature. This is the necessity and importance of music education as a teacher to determine the necessity of piano lessons. In parallel, the piano re-determined training program, developed new approaches to teaching and improved student developing positive attitudes towards negative attitudes.

Piano lessons are a very important factor in student motivation. New approaches to raising student motivation instructors teaching the piano, hands-on course, the student and the student's attention then collect. In this case, we also may increase the level of student achievement.

Due to the large piano lessons with students one-on-one lecturers in question. Due to the scarcity of spare hours of lessons observed teaching staff in the institution. Therefore, a sufficient number of institutions on the piano faculty members thought that this problem be addressed.

Education in piano performance, considering it is a course that requires hours of course a fact that is very important for students and teaching staff. 1 hour a week is not enough for the student who has emerged piano education. At the same time course load of faculty teaching performance drops due to an excess of 1 hour piano lesson with a completely negative effect on yield. Thus, unable to follow the development of the student's individual academic staff within 1 hour, the student cannot take control of their work. Therefore, the program should be discussed, hours requested.

The small number of pianos and piano study rooms is inadequate in terms of understanding of the knowledge and skills required for the course. In the absence of piano lessons and assignments given to each student's home could not confer limited working hours. Thus, the performance loss is experienced. Number of Rooms amplified piano and piano tuning and maintenance of pianos made and students who have achieved the level of success is thought.

Students evaluate the effective working time. For this to happen to student work programs, control of working hours, and is thought to be under constant supervision. Therefore, students learn about the issues that it will face in the student's academic staff, to what extent is the work studied the piano as a lesson in how you should work and how an active player continuously emphasized on the need to take place to the success of the students are expected to create a huge impact.

Music education in the constantly researched not only the piano is provided that the objectives and aims of education. The student in mind the requirements of the profession of music teacher chooses the program should be established in the future. The use of the piano teaching profession in mind, plans to acquire the necessary skills and behavior training program, the establishment of a piano, can be said to be important in terms of the rise to success.

Rating scale used to determine the student's grade must be reported to the student. Know the behavior of the target and a student preparing for the exam will operate according to the intended behavior. Thus, he has failed to assess the success or why. So I announced to the student exam reviews student motivation is thought to rise.

Frequently performed piano concerts section. Students should listen to others, the necessity of the works will enter the work will be further work is required. Also individual efforts and achievements of both students and lecturers, promoting and supporting the work that it is necessary to increase self-confidence.

Education is extremely important in taking the positive results in compliance with the physical environment. First, the physical conditions required for the fulfillment of piano education in piano education in both the transmitter and receiver location will bring you more productive. Developments in this regard will be provided is thought to be important in the first degree.

Of course cannot be measured only physical conditions of the working environment to be healthy. In this environment, the productivity of the people must be matured in terms of psychological trigger. Easing the burden of the course lecturers will be reflected in the student more time and attention. Students who successfully work and it more. Will reveal the psychological maturity of mutual satisfaction. Piano education, the creation of such a work environment is believed to bring top-level achievements.

This research aims to determine the problems experienced in piano education. After that, the work done on the piano education is thought to be the guiding nature. technical levels, as they are irrelevant to arrest and class listed.

IJONTE's Note: This article was presented at 4th International Conference on New Trends in Education and Their Implications - ICONTE, 25-27 April, 2013, Antalya-Turkey and was selected for publication for Volume 4 Number 2 of IJONTE 2013 by IJONTE Scientific Committee.

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REFERENCES

Agay, D. (1981), Teaching Piano, Volume I, Yorktown Music Press Inc, New York.

Bastien, J. W. (1973), How to Teach Piano Successfully, Third Edition, Neil A. Kjos Music Company, San Diego, California.

Bulut, D. (2004), Müzik Öğretmeni Yetiştiren Kurumlarda Alınan Piyano Eğitiminin Müzik Öğretmenliğinde Kullanılabilirliği, 1924 – 2004 Musiki Muallim Mektebinden Günümüze Müzik Öğretmeni Yetiştirme Sempozyumu Bildirisi, Isparta.

Kahramansoy, C. (2006), Müzik Öğretmenliği Programlarında Görevli Piyano Öğretim Elemanlarının Müzik Alan Bilgisinin Derse Transferi, Abant İzzet Baysal Üniversitesi, Sosyal Bilimler Enstitüsü, Yayınlanmamış Yüksek Lisans Tezi, Bolu.

Kutluk, Ö. (1996), Okul Şarkılarına Piyano İle Eşlik Yapabilme Becerisinin Geliştirilmesi Üzerine Bir Çalışma, Yayınlanmamış Yüksek Lisans Tezi, Selçuk Üniversitesi, Konya.

Newman, W. S. (1984), The Pianist's Problems, Fourth Edition, Da Capo Press, New York.

Özen, N. (1996), Müzik Eğitiminde Çalgı Eğitiminin Önemi, Filarmoni Sanat Dergisi, 20. sayı.

Yılmaz, P. (2005), İnönü Üniversitesi Güzel Sanatlar Eğitimi Müzik Eğitimi Anabilim Dalı Piyano Öğretim Elemanları ve 3. Sınıf Öğrencilerinin Piyano Eğitimine İlişkin Görüşleri, Ankara Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Yayınlanmamış Yüksek Lisans Tezi, Ankara.

Yönetken, H., Bedii. (1996), "Müzik Öğretimi",*Okulda Çalgı Sorunu ve Çalgısal Müzik Etkinlikleri*, Müzik Ansiklopedisi Yayınları, s. 69, Ankara.

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BIOLOGY DEPARTMENT AND SCIENCE EDUCATION STUDENTS' ENVIRONMENTAL SENSITIVITY, ATTITUDE AND BEHAVIOURS

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ABSTRACT

The aim of this study is, to determine the students' environmental sensitivity, attitude and behaviour levels in terms of different variables. The sample included a total of 507 students who studied at Biology department and Science Education undergraduate programme of a state university in Turkey. "Environmental Sensitivity, Attitude and Behaviour Scale" and "Personal Information Form" were used for data collection. Findings show that, there was found a meaningful difference in terms of gender, grade level, choice order, to be a member of civil society organization and reading at least one journal about environment variables. According to their undergraduate programmes and living places there was not found any meaningful difference at all sub-dimensions.

Key Words: Environmental Sensitivity, Environmental Attitude, Environmental Behaviour.

INTRODUCTION

In last three decades, concerns about the environment have increased. Initially, people were interested in discovering the main environmental problems (Fraj & Martinez, 2007). Because at present, one of the greatest problems facing Earth is the impact of humans on environment (Stern, Dietz & Kalof, 1993). Moving towards the goal of sustainability, requires fundamental changes in human attitudes and behaviour. Progress in this direction is thus critically dependent on education and public awareness (UNESCO, 1997). Subsequently, consumers became aware of the need to make more responsible purchases and looked to the institutions to behave in this way too. People are aware that environmental protection is not only the task of firms and institutions, but also their responsibility as consumers (Fraj & Martinez, 2007). So the investigation of students' environmental sensitivity, attitude and behaviours and the discussion of the results have a critical importance. Because Kaiser & Shimoda (1999)'s research results show that, environmental sensitivity is an explanatory variable for environmental behaviours and Kaiser, Wölfing & Fuhrer (1999)'s research results show that, environmental attitudes are an explanatory variable for environmental behaviours. And environmental sensitivity does not effect the environmental behaviour directly but, people who have high environmental attitudes behave environmentalist and they show a tendency to buy ecologic products (Yılmaz, Çelik & Yağızer, 2009). In this framework the aim of this study is to determine the biology department and science education students' environmental sensitivity, attitude and behaviour levels in terms of different variables. Investigation of students' environmental sensitivity, attitude and behaviours in terms of different variables and discussion of the results towards the sub dimensions will contribute to recognize the students at different faculties of a university and to find out that any environmental education programme for students is necessary or not. Also this study will remind the "environmental sensitivity", "environmental attitude" and "environmental

behaviour" concepts to the students again that are very important for environment and human being interaction. For that purpose, the sub-questions of the research are as following:

1. What are the biology department and science education undergraduate programme students' environmental sensitivity, attitude and behaviours?
2. Do the biology department and science education undergraduate programme students' environmental sensitivity, environmental attitude and environmental behaviours differ in terms of the variables such as gender, undergraduate programme, grade level, choice order, living places, to be a member of civil society organization about environment and reading at least one journal about environment variables?

METHOD

Research Model
A general screening model was used in this study.

Participants
The participants of the research includes, randomly chosen through sample method, total of 507 students studying at biology department (n=249) and science education undergraduate programme (n=258) at a state university in Turkey.

Data Collection Tools
Environmental Sensitivity, Attitude and Behaviour Scale: This five point likert scale developed by Yılmaz, Yıldız & Arslan (2011), profitted by researches of Kaiser & Wilson (2000), Fraj & Martinez (2007), Tilikidou & Delistavrou (2008) and Yılmaz, Çelik & Yağızer (2009). It is consisted of 17 items and three factors named as "environmental sensitivity", "environmental attitude" and "environmental behaviour". The coefficiencies of the internal consistency are respectively 0.75, 0.53 and 0.74. Confirmatory Factor Analysis calculated by lisrel 8.74 and the results support that the scale consisted of three subscales (df=291, X^2=487,77, X^2/ df= 1,68, RMSEA=0.047, GFI=0.89, AGFI=0.87, NFI= 0,92, NNFI= 0.97, CFI= 0.97). As a five degree scale was used, the interval coefficients were calculated for four intervals (5-1=4), (4/5=0.80) and the students' means of environmental sensitivity, attitude and behaviours have been interpreted in accordance with the criteria below.
Never = 1.00-1.80   Rarely = 1.81-2.60   Sometimes= 2.61-3.40   Often = 3.40-4.20   Always= 4.21-5.00

The Personal Information Form: In the personal information form prepared by researchers; the questions in relation with the demographical characteristics such as gender, undergraduate programmes, grade level, choice order, living places, to be a member of civil society organization about environment and reading at least one journal about environment have taken part.

Data Analysis
The data collected with the scale was inputted into the computer according the codes that were given the each question on the scale. When inputting the data process was finished, the data was processed and analyzed. In the analysis of the data, arithmetic mean and standard deviation of the students' points were calculated by SPSS 18 package programme. In addition to this, Mann Whitney U and Kruskal Wallis have been used. The significance level was accepted as 0.05.

FINDINGS
In this part findings were given according to the sub-questions as following:
The Findings of the First Sub-question: "What are the biology department and science education undergraduate programme students' environmental sensitivity, environmental attitude and environmental behaviours?" have been given in Table 1.

Table 1: Students' Evironmental Sensitivity, Attitude and Behaviours

Sub-dimensions of the scale	Score Interval	n	Mean	SD	Min	Max	The number of items	Level
Environmental Sensitivity	Totally Disagree Disagree	507	4,34	.59	1,17	5	6	TA
Environmental Attitude	Indecisive Agree	507	3,99	.63	1,25	5	4	A
Environmental Behaviour	Totally Agree	507	3,30	.64	1,00	5	7	I

Totally Agree: TA   Agree: A   Indecisive: I   Disagree: DA   Totally Disagree: TD

As you see in Table 1, students "totally agree" that they are sensitive to environment ($\overline{X}$ = 4,34), "agree" that their attitudes to environment are at high levels ($\overline{X}$ = 3,99), but they are "indecisive" to behave environmentalist ($\overline{X}$ = 3,30).

The Findings of the Second Sub-question: "Do the biology department and science education undergraduate programme students' environmental sensitivity, environmental attitude and environmental behaviours differ in terms of the variables such as gender, grade level, choice order, to be a member of civil society organization about environment, reading at least one journal about environment, undergraduate programme and living places variables?" have been given in Tables.

Table 2: Students' Environmental Sensitivity, Attitude, Behaviours and Gender

Sub-dimensions of the scale	Gender	n	Mean Rank	Sum of Ranks	U	p
Environmental Sensitivity	Girl	331	268,99	89034,50	24167,5	.001*
	Boy	176	225,82	39743,50		
Environmental Attitude	Girl	331	259,49	85892	27310	.243
	Boy	176	243,67	42886		
Environmental Behaviour	Girl	331	265,24	87794	25408	.018*
	Boy	176	232,86	40984		

*Statistically significant differences at p < .05.

As seen in Table 2, there is a meaningful difference (p<0.05) in terms of gender in the sub-dimensions of "Environmental Sensitivity" and "Environmental Behaviour". In other words, the girls' environmental sensitivities and environmental behaviours are higher than that of boys. On the other hand, there is no meaningful difference in terms of gender in the sub-dimension of "Environmental Attitude".

Table 3: Students' Environmental Sensitivity, Attitude, Behaviours and Undergraduate Programme

Sub-dimensions of the scale	Undergraduate Programme	n	Mean Rank	Sum of Ranks	U	p
Environmental Sensitivity	Biology Department	249	262,87	65454	29913	.178
	Science Education	258	245,44	63324		
Environmental Attitude	Biology Department	249	253,79	63193,50	32068,50	.974
	Science Education	258	254,20	65584,50		
Environmental Behaviour	Biology Department	249	243,62	60661	29536	.116
	Science Education	258	264,02	68117		

Table 3 shows that, there is no meaningful difference ($p>0.05$) in terms of undergraduate programmes, in all sub-dimensions that are "Environmental Sensitivity", "Environmental Attitude" and "Environmental Behaviour".

Table 4: Students' Environmental Sensitivity, Attitude, Behaviours and Grade Level

Sub-dimensions of the Scale	Grade level	n	Mean Rank	df	X^2	p
Environmental Sensitivity	1	114	258,15			
	2	137	220,64			
	3	150	258,01	3	12,864	.005*
	4	106	286,98			
Environmental Attitude	1	114	241,17			
	2	137	247,47			
	3	150	262,96	3	2,194	.533
	4	106	263,55			
Environmental Behaviour	1	114	257,67			
	2	137	242,43			
	3	150	265,33	3	1,958	.581
	4	106	248,97			

As seen in Table 4, there is a meaningful difference ($p<0.05$) in terms of grade level only in the sub-dimension of "Environmental Sensitivity". In other words, fourth grade students' environmental sensitivities are higher than that of first, second and third grade students. On the other hand, there is no meaningful difference in terms of grade level in the sub-dimensions of "Environmental Attitude" and "Environmental Behaviour".

Table 5: Students' Environmental Sensitivity, Attitude, Behaviours and Choice Order

Sub-dimensions of the Scale	Choice Order	n	Mean Rank	df	X^2	p
Environmental Sensitivity	First	110	265,58			
	Second-Fifth	160	258,58			
	Sixth- Tenth	89	258,42	3	2,778	.427
	Tenth and above	148	237,78			
Environmental Attitude	First	110	281,49			
	Second-Fifth	160	259,15			
	Sixth- Tenth	89	231,86	3	7,333	.062
	Tenth and above	148	241,32			
	First	110	269,31			
	Second-Fifth	160	268,39			
Environmental Behaviour	Sixth- Tenth	89	214,52	3	9,328	.025*
	Tenth and above	148	250,80			

Table 5 shows that, there is a meaningful difference (p<0.05) in terms of choice order only in the sub-dimension of "Environmental Behaviour". In other words, students who choose their undergraduate programmes at their first choice have higher environmental sensitivity than that of students who choose their undergraduate programmes at their second and above choices. On the other hand, there is no meaningful difference in terms of choice order in the sub-dimensions of "Environmental Sensitivity" and "Environmental Attitude".

Table 6: Students' Environmental Sensitivity, Attitude, Behaviours and Living Places

Sub-dimensions of the Scale	Living Places	n	Mean Rank	df	X^2	p
Environmental Sensitivity	Metropolis	191	266,15			
	City	122	251,10			
	District	131	253,98	3	4,275	.233
	Village	63	222,83			
Environmental Attitude	Metropolis	191	254,16			
	City	122	259,73			
	District	131	246,05	3	,655	.884
	Village	63	258,94			
Environmental Behaviour	Metropolis	191	257,87			
	City	122	242,53			
	District	131	257,42	3	,991	.803
	Village	63	257,36			

When Table 6 is examined, there is no meaningful difference (p>0.05) in terms of living places, in all sub-dimensions that are "Environmental Sensitivity", "Environmental Attitude" and "Environmental Behaviour".

Table 7: Students' Environmental Sensitivity, Attitude, Behaviours and To be a Member of Civil Society Organization About Environment

Sub-dimensions of the scale	To be a Member of Civil Society Organization About Environment	n	Mean Rank	Sum of Ranks	U	p
Environmental Sensitivity	Member	65	300,84	19554,50	11320,50	.005*
	Not Member	442	247,11	109223,50		
Environmental Attitude	Member	65	294,53	19144,50	11730,50	.016*
	Not Member	442	248,04	109633,50		
	Member	65	301,29	19584,00	11291	.005*
Environmental Behaviour	Not Member	442	247,05	109194		

Table 7 shows that, there is a meaningful difference (p<0.05) in terms of to be a member of civil society organization about environment in all sub-dimensions. In other words, students who are a member of civil society organization about environment have higher environmental sensitivity, attitude and behaviours than that of students who are not a member civil society organization about environment.

Table 8: Students' Environmental Sensitivity, Attitude, Behaviours and Reading at Least One Journal About Environment

Sub-dimensions of the scale	Reading at Least One Journal About Environment	n	Mean Rank	Sum of Ranks	U	p
Environmental Sensitivity	Read	61	276,08	16841	12256	.206
	Not Read	446	250,98	111937		
Environmental Attitude	Read	61	278,93	17014,50	12082,50	.153
	Not Read	446	250,59	111763,50		
	Read	61	294,54	17967	11130	.021*
Environmental Behaviour	Not Read	446	248,46	110811		

As seen in Table 8, there is a meaningful difference (p<0.05) in terms of reading at least one journal about environment only in the sub-dimension of "Environmental Behaviour". In other words, students who read at least one journal about environment have higher environmental behaviour than that of students who don't read a journal about environment. On the other hand, there is no meaningful difference in terms of this variable in the sub-dimensions of "Environmental Sensitivity" and "Environmental Attitude".

DISCUSSION AND RESULTS

The aim of this study was to determine the environmental sensitivities, attitudes, behaviours of biology department and science education students, in terms of different variables such as gender, undergraduate programme, grade level, choice order, living places, to be a member of civil society organization and reading at least one journal about environment.

As a result of the applied analysis, students' mean points from environmental sensitivity ($\overline{X}$ = 4,34) and environmental attitude ($\overline{X}$ = 3,99) are at high levels. Only from environmental behaviour, students' mean

points are a little low ($\overline{X}$ = 3,30). It shows that, students "totally agree" that they are sensitive to environment, "agree" that their attitudes to environment are at high levels, but beside these, they are "indecisive" to behave environmentalist.

While students' environmental sensitivities and behaviours differ in terms of gender in favor of girls, their environmental attitude doesn't differ. Students' environmental sensitivities (Çabuk & Karacaoğlu, 2003; Çelen, Yıldız, Atak, Tabak & Arısoy, 2002; Yurtseven, Vehid, Köksal & Erdoğan, 2010) and environmental behaviours (Akıllı & Yurtcan, 2009) are high in favor of girls in given studies too. The result of this research about students' environmental attitudes also supports other studies (Kahyaoğlu, Daban & Yangın, 2008). It is expected that, women behave empathic, sensitive, permissive, kindly, thoughtful, tidy and responsible (Kağıtçıbaşı, 1990). These expectations of society make women to use ecologic resources economical and behave them environmentalist. This result can be because of these expectations. According to the undergraduate programme, there was not found any meaningful difference between Biology department and Science Education students. As we investigate the curricula, lessons related to ecology and environmental education take part in biology department and Science Education undergraduate programmes both. And the students, who succeed these undergraduate programmes, come from science-maths department of the high schools.

According to the grade level, while students' environmental attitudes and behaviours don't change, only students' environmental sensitivities differ in favor of fourth grade students. According to the grade level, considering the correlation between environmental sensitivity, attitude and behaviour, only the changing of their environmental sensitivities is a remarkable finding. On the other hand, the difference might be due to the courses related to ecology that students took during their education at university. Engin (2003)'s study results about grade level is parallel with our study results.

In terms of choice order, there was found a meaningful difference only at environmental behaviour in favor of students who choose their undergraduate programme at their first choice. Infact, it is expected that students' environmental sensitivities, attitudes and behaviours must be change correspondingly. As is known, education, is a process to constitute changes through their own experience in the desired direction and deliberately at a person's behaviour (Ertürk, 1987). As the education occurs in the desired direction, students' choice orders are very important to achieve their undergraduate programmes.

Akıllı & Yurtcan (2009)'s research findings show that, there was a meaningful difference in terms of living places in environmental attitudes and behaviours but this research results show that there was not found any meaningful difference (p>0.05) in terms of living places, at all sub-dimensions.

According to the analysis, while, only sixty-five students are members of civil society organization about environment, beside this, four hundred forty-two students are not. The number of students who aren't members of civil society organization about environment is great. There was found meaningful difference (p<0.05) in terms of to be a member of civil society organization about environment in all sub-dimensions. In other words, students who are a member of civil society organization about environment have higher environmental sensitivity, attitude and behaviours than that of students who are not. In terms of this variable other research results (Sadık & Çakan, 2010; Uzun & Sağlam, 2006) are parallel with this research results.

The last variable was, reading at least one journal about environment. The analysis shows that, number of students who read at least one journal about environment is almost the same with the number of students who are members of civil society organization about environment. Only sixty-one students read at least one journal about environment among five hundred seven students. There was found a meaningful difference (p<0.05) in terms of reading at least one journal about environment only in the sub-dimension of "Environmental Behaviour". In other words, students who read at least one journal about environment have higher environmental behaviour than that of students who don't read a journal about environment. On the other hand, there was not found any meaningful difference in terms of this variable in the sub-dimensions of "Environmental Sensitivity" and "Environmental Attitude". Similar to the other results according to grade level,

108

considering the correlation between environmental sensitivity, attitude and behaviour, only the changing of their environmental behaviours is a remarkable finding.

Because of the term, "environment" is very important for all, so the teachers' and the parents' roles must be to educate children as a good environment protectors in the lessons and at their special lives. For this reason, on the other researches with different participants and age groups, environmental sensitivity, attitude and behaviours must be searched out with other variables.

IJONTE's Note: This article was presented at World Conference on Educational and Instructional Studies - WCEIS, 07- 09 November, 2012, Antalya-Turkey and was selected for publication for Volume 4 Number 3 of IJONTE 2013 by IJONTE Scientific Committee.

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REFERENCES

Akıllı, M. & Yurtcan, M. T. (2009). İlköğretim Fen Bilgisi Öğretmeni Adaylarının Çevreye Karşı Tutumlarının Farklı Değişkenler Açısından İncelenmesi (Kazım Karabekir Eğitim Fakültesi Örneği). *Erzincan Eğitim Fakültesi Dergisi,* Cilt-Sayı: 11-2, 119-131.

Çabuk, B. & Karacaoğlu, Ö. C. (2003). Üniversite Öğrencilerinin Çevre Duyarlılıklarının İncelenmesi. *Ankara Üniversitesi, Eğitim Bilimleri Fakültesi Dergisi,* cilt: 36, sayı:1-2, 189-198.

Çelen, Ü., Yıldız, A., Atak, N., Tabak, R.H. & Arısoy, M. (2002). Ankara Üniversitesi Sağlık Eğitim Fakültesi Öğrencilerinin Çevre Duyarlılığı ve İlişkili Faktörler, *8.Ulusal Halk Sağlığı Kongresi, 23-28 Eylül 2002, Diyarbakır,* 421-425.

Engin, A. (2003). Fen Bilgisi ve Biyoloji Öğretmen Adaylarının Üniversite Ekoloji Dersi Öncesi ve Sonrası Çevre Bilgileri ve Tutumları, *Unpublished Master Dissertation,* Marmara University, İstanbul.

Ertürk, S. (1987). *Eğitimde Program Geliştirme*. Ankara:

Fraj, E. & Martinez, E. (2007). Ecological Consumer Behaviour: An Emprical Analysis, *International Journal of Consumer Studies* 31: 26-33.

Kağıtçıbaşı, Ç. (1990). *İnsan, Aile, Kültür.* (3. Baskı), İstanbul: Remzi Kitabevi.

Kahyaoğlu, M., Daban, Ş. & Yangın, S. (2008). İlköğretim Öğretmen Adaylarının Çevreye Yönelik Tutumları. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi,* 11, 42-52.

Kaiser, F. G. & Shimoda, T. A. (1999). Responsibility As A Predictor of Ecological Behaviour. *Journal of Environmental Psychology,* 19,243-253.

Kaiser, F. G., Wölfing, S. & Fuhrer, U. (1999). Environmental Attitude and Ecological Behaviour. *Journal of Environmental Psychology,* 19, 1-19.

Kaiser, F. G. & Wilson, M. (2000). Assessing People's General Ecological Behavior: A Cross-Cultural Measure, *Journal of Applied Social Psychology* 30(5): 952-978.

Sadık, F. & Çakan, H. (2010). Biyoloji Bölümü Öğrencilerinin Çevre Bilgisi ve Çevre Sorunlarına Yönelik Tutum Düzeyleri. *Çukurova Üniversitesi, Sosyal Bilimler Enstitüsü Dergisi,* cilt: 19, sayı: 1, 351-365.

110

Stern, P. C., Dietz, T. & Kalof, L. (1993). Value Orientations, Gender, and Environmental Concern. *Environment and Behaviour, 25*, 322-348.

Tilikidou, I. & Delistavrou, A. (2008). Types And Influential Factors of Consumers' Non-Purchasing Ecological Behaviors, *Business Strategy and the Environment* 18: 61-76.

UNESCO, (1997). Educating for a Sustainable Future: a Transdisciplanary Vision for Concerned Action. *Paper presented at the International Conference on Environment and Society: Education and Public Awareness for Sustainability,* Thessaloniki, Greece, 8-12, December.

Uzun, N. & Sağlam, N. (2006). Ortaöğretim Öğrencilerinin Çevreye Yönelik Tutumlarına ve Akademik Başarılarına "Çevre ve İnsan" Ders İle Gönül Çevre Kuruluşlarının Etkisi, *VII. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi (Sözlü Bildiri), Gazi Üniversitesi Eğitim Fakültesi, 07–09 Eylül 2006,* Ankara.

Yılmaz, V., Çelik, H. E. & Yağızer, C. (2009). Çevresel Duyarlılık ve Çevresel Davranışın Ekolojik Ürün Satın Alma Davranışına Etkilerinin Yapısal Eşitlik Modeliyle Araştırılması, *Anadolu Üniversitesi Sosyal Bilimler Dergisi* 9(2): 1-14.

Yılmaz, V., Yıldız, Z. & Arslan, T. (2011), Üniversite Öğrencilerinin Çevresel Duyarlılık İle Çevresel Davranışlarının Yapısal Eşitlik Modeliyle Araştırılması*, Dumlupınar Üniversitesi Sosyal Bilimler Dergisi* 30: 271-278.

Yurtseven, E., Vehid, S., Köksal, S. & Erdoğan, M. S. (2010). İstanbul Üniversitesi Sağlık Hizmetleri Meslek Yüksek Okulu Öğrencilerinin Çevresel Riskler Konusundaki Duyarlılıkları. *Fırat Üniversitesi, Sağlık Bilimleri Tıp Dergisi,* 24(3), 193-199.