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The Effects of Environment and Family Factors on Pre-Service Science Teachers' Attitudes Towards Educational Technologies (The Case of Muğla University-Turkey)

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1. Introduction

In our world, where information and technology is increasingly developing, it is undeniable fact that technology has great impact on education. The main goal of education is to equip individuals with required knowledge and show them how to use this knowledge. To do so, the traditional methods used seem to be inadequate. In this respect, there is a need to make use of educational technologies (Uzunboylu, 1995; Yenice, 2003).

Every type of tool and equipment helping to reduce the interaction between the student and the subject that needs to be learned to the level where the student can understand it is in the scope of educational technologies. In the classroom wide-range of materials ranging from teacher, chalk and blackboard to educational videos and virtual environment can be used (Akpınar, 2004; Hannafin & Peck, 1988). It is of great importance to make use of more educational tools in the classroom to help students understand better. In today's classrooms, visual and auditory materials come to the fore. For these visual and auditory materials to be effectively used, the specific features of the tools should be known. These features may seem to be very simple sometimes, but they can be very important for the effective use of a tool; hence, for the quality of the lesson (Küçükahmet, 1999). Binbaşıoğlu (1994) reported the good sides of educational materials-based teaching as follows: they help maintain the continuity of teaching and enhance motivation, they help teach correctly, they bring variety, reality and concreteness to teaching and learning environment and they are emotionally enriching. On the other hand, they lessen the use of language, they can be really expensive, they may be time-consuming, teachers may not be qualified enough to use such tools and they may lead to deterioration of thinking skills (Rüzgar, 2005).

Alper and Gülbahar (2009; 124-125) performed a meta-analysis on studies carried out on educational technologies between 2003 and 2007, and they found that most of the studies focus on "the effects of multimedia-enhanced computer" and "integration of technology and internet education". Research looking at the application of various dimensions of education technology in teaching has revealed that educational technology applications have multi-

dimensional positive impacts on student achievement. In this respect, various learning materials (games, analogies, sample events, experiments and models) (Aktamış et al., 2002), teaching through models (Şahin et al., 2001), computer-assisted materials (Akdeniz and Yiğit, 2001; Kibos, 2002; Yumuşak and Aycan, 2002) have been found to improve students' achievement. Akpınar et al. (2005) investigated the students' opinions about the use of technology in Science Course at elementary level and the teachers' frequency of use of technological tools and equipments in science courses. They found significant differences between private and state schools and depending on the type of the school, they found significant differences among students' opinions and frequency of use.

Can (2010) carried out a study with 184 pre-service teachers from the department of elementary education to determine their attitudes towards the effects of using two teaching materials, over head projector and projector, on learning. At the end of the study, the author found that the pre-service teachers have generally positive attitudes because they think that the use of these materials bring variety and change to teaching environment, eliminates monotony from the class, and provides colorful, lively and smooth learning-teaching. Frantom et al. (2002) carried out a study to investigate the children's attitudes towards technology, and they obtained two-factor scale consisting of interest, ability and alternative characteristics. When the elementary and secondary school students' scores taken from these two sub-dimensions were compared, significant differences were found between them. At the same time, the attitude varies depending on gender. Dalton and Hannafin (1986) evaluated the effects of video, computer-assisted teaching, interactive video applications on learning performance and attitude and they found that the participants think that only computer-assisted teaching is effective and there is no need for interactive videos. On the other hand, when interactive-video teaching was compared to computer-assisted teaching and video, it was found that it could significantly affect the attitudes of students of low ability (Cited in Yavuz & Coşkun, 2008).

Tanguma et al. (2002) investigated technology utilization models within a context of a course. They found that the teachers use package programs in subject area, they carry out impressive applications with tools such as scanner, digital recorder and voice recording machine and they make use of technology and internet in their lessons. Woodrow (1992) reported that there is a correlation between the attitudes towards technology and computer experience. Chou (1997) stated that computer experience affects teachers' attitudes towards computer. According to Ropp (1999), there is a significant relationship between computer access and attitudes towards computer and use of computer for an hour in week.

When education is considered as a unity, it is not possible to achieve its objectives by only focusing on information given at school and excluding students' families and the environment where they have been brought up from the process. The training of an individual is not limited to the places of formal education.

One of the most important two factors determining human behavior, environment (the other is heritage) can be defined as the physical, biological, social, economic and cultural settings where individuals maintain their relationships and carry out their mutual interactions throughout their lives. Environment means everything affecting an individual. The individual himself/herself is an internal part of this environment. A social creature, man is in various interactions within the social environment where he/she lives as a

complementing part of it. The environment covers all the systems either being physical, chemical and biological (Yiğit & Bayrakdar, 2006). Throughout their lives, humans gain information, skills, attitudes and values as a result of their interactions with the environment. The basis of education is made up by these experiences (Ertürk, 1993).

According to Herman (1998), any person is born with genetically inherited characteristics which make up 30% of his/her personality and the remaining 70% of the personality is shaped by environmental conditions such as the things provided by parents, information gained from formal and informal education, things learned from peer circles, and the culture where he/she is brought up. The ecologic environment and family environment where the individual was born and brought up have great impacts on the formation of the characteristics of the individual. Environmental conditions such as place of residence, housing facilities, transportation, education, health, recreational activities, public utilities etc. and the family conditions such as socio-economic structure of the family, its education level, income level, relationships with neighbors, inter-family relations, the family members' success in performing their role functions have the potential to affect an individual's personal characteristics and skills to communicate with the environment (Kut & Koşar 1989: 19; cited in Deniz, 2003). Within the context of the environment where people are brought up, there may be some important variations observed among the people based on whether they are brought up rural or urban area, socio-economic level and the opportunities possessed to make use of educational facilities. Education process starting in the family and continuing at school and by means of various tools of mess media may vary significantly depending on an individual's coming from rural or urban area and education level of the family.

Besides the high number of students who are not able to attend school continuously without any interruption in Turkey, for many students who can attend a formal education institution regularly, developed technological tools are not available in their personal environment. In this respect, it can be argued that schools exhibit heterogonous structure rather than homogenous structure; hence, students may encounter inequalities stemming from the environments they have been brought up. Moreover, students coming from similar types of families concentrate on similar types of schools and this leads to increasing differentiations and inequalities among schools. This is not the problem specific to only the schools in underdeveloped or developing countries, in developed countries inequalities can be observed depending on local, regional, ethical, racial, linguistics and sexual variables (Berne 1994; Kozol, 1991; Spring, 1998, s.48-49, as cited in Aksoy, 2003). These result in differences in students' chance to encounter educational technologies having an important place in education process.

In rural areas, due to parents' low level of education, the opportunity of drawing on educational facilities and materials is restricted and this may prevent individuals from developing positive attitudes. However, in urban areas where socio-economic level is high, usually the education level of parents is high. Hence, the children of these parents have more opportunities such as the availability of computers, internet, newspapers, magazines, scientific journals, videos, CDs, mobile phones, familiarity with satellite receivers and all the other technological tools and this has positive influence on children's attitudes towards technological tools and their use of frequency of these tools.

In literature, there are various studies looking at the effects of environment where the individual is brought up or those of education level of parents. Akpınar (2003) conducted a study to investigate how teachers graduated from universities located in different regions

use internet resources inside and outside the class and found that there is a significant difference favoring teachers graduating from universities located in a metropolis (İstanbul, Ankara, İzmir, Bursa, Adana, Gaziantep) or in a sea city. It was found that teachers graduating from universities located in East, South East and Central Anatolia make less use of internet. Erol and Gezer (2006) found that parents' education level and the environment where they live do not have any significant influence on classroom pre-service teachers' perceptions of environment and environmental problems. Devecioğlu and Sarıkaya (2006) conducted a descriptive study to determine the profiles of the students of school of sports in light of some socio-economic variables including parents' education status.

Determination of the attitudes of pre-service science teachers who make up the core of education towards educational technologies can make important contributions to the efficiency and quality of education in general. Among the studies dealing with educational technologies, the number of studies looking at the effects of the environment where pre-service teachers were brought up and their parents' educational status is few and this increases the importance of the present study. Moreover, the present study is thought to have important contributions by drawing the attention to family and environment factors which are important dimensions of education process and providing guidance to researchers, educators and practitioners working in the relevant fields. As stated by Thomas Gordon **"The first and most effective teachers of children are their parents",** education starts in the family, hence, it is assumed that the environment where pre-service science teachers have been brought up and their parents' educational status can have influences on their attitudes towards educational technologies.

1.1 Purpose of the study

The present study aims to determine the effects of the environments where pre-service science teachers have been brought up and the educational level of their parents on their attitudes towards educational technologies. For this purpose, answers to the following questions were sought:

- What is the level of pre-service science teachers' attitudes towards educational technologies?
- Do the pre-service science teachers' attitudes towards educational technologies significantly vary depending on the environment where the pre-service teachers were brought up?
- Do the pre-service science teachers' attitudes towards educational technologies significantly vary depending on their parents' educational level?

2. Method

The sampling of the study which employed survey method consists of 101 first-year students attending science teacher education department of the education faculty at Mugla University in 2009-2010 academic year.

2.1 Data collection

As a data collection tool, personal information form developed by the researcher and 43-item Scale of Attitudes towards Educational Technologies develop by Pala (2006) to elicit the

participants' attitudes towards educational technologies were used. The students were given detailed information about attitude scale and then the scale was administered to those who were willing to participate in the study. It was observed that completion of the scale lasted about 15-20 minutes. The data obtained from the scale were entered into computer and appropriate statistical analyses were conducted. The reliability of the scale was tested through SPSS 14 program package with Cronbach Alpha coefficient and found to be 0.78. This value shows that the scale is reliable and it is enough for it to be administered. In order to establish the validity of the scale, experts opinions were sought about whether the items in the scale measure the attitudes intended. The scale includes five options ranging from "Strongly agree", "Agree", "Undecided", "Disagree" and "Strongly disagree". Scoring was performed from 5 to 1 for positive statements and from 1 to 5 for negative statements. The lowest possible score to be obtained from the scale is 43 and the highest score is 215. If the score obtained is in the range 43-77, it means "Strongly disagree", 78-111 "Disagree", 112-145 "Undecided", 146-179 "Agree" and 180-215 "Strongly agree".

2.2 Data analysis

The data obtained through the scale were analyzed through SPSS program package. Independent-samples t-test was used to test whether there is a significant difference among the students' attitudes based on the environment where they were brought up and One-way ANOVA was used to test whether there is a significant difference among the attitudes based on parents' educational level.

3. Findings and discussions

3.1 Findings concerning the first sub-problem

The first sub-problem of the study is "What are the pre-service science teachers' attitudes towards educational technologies?" The findings concerning this sub-problem reveal that the mean score for the pre-service science teachers' attitudes towards educational technologies is 169.66, standard deviation is 14.19; the lowest score taken from the attitude scale is 125 and the highest score is 207. According to these scores, the pre-service science teachers' general attitude is in the category of "Agree". This finding shows that the students in general have positive attitudes towards educational technologies. There are similar findings reported in the literature. Gunter, Gunter & Wiens (1998) found that pre-service teachers have more positive attitudes towards working on computer and learning through computer and technology in general. Yılmaz (2005), in his thesis study, investigated the effects of technology on students' achievement and attitude and found positive impacts on achievement and attitude. In another study, Sevindik (2006) found positive effects of using smart classes in higher education on students' academic achievement and attitudes. Yavuz and Coşkun (2008) found that pre-service elementary school teachers have positive attitudes towards and opinions about the use of technological tools and equipments.

3.2 Findings concerning the second sub-problem

The second sub-problem of the study is "Do the pre-service science teachers' attitudes towards educational technologies vary significantly depending on the environment where they have been brought up?" T-test was conducted to test whether there is a statistically significant

difference among the pre-service science teachers' attitudes towards technology based on the environment they have been brought up and the results are presented in Table 1 and Table 2.

Environment	Frequency	%
Urban area	85	84.2
Rural area	16	15.8
Total	101	100.0

Table 1. Distribution of the pre-service science teachers according to environment where they have been brought up

Of the pre-service science teachers, 15.8% come from rural area and 84.2% from urban area. As the pre-service science teachers coming from urban area probably have had better technological opportunities, they are expected to exhibit more positive attitudes.

Environment	N	$\overline{X}$	S	df	t	p
Urban area	85	169.80	14.40	99	.22	.82
Rural area	16	168.93	13.44			

Table 2. T-test results for the science pre-service teachers' attitude scale scores in relation to environment where they have been brought up

According to the t-test results presented in Table 2, there is no significant difference among the attitudes based on the environment where they have been brought up [$t_{(99)} = .22$, $p > .05$]. This finding indicates that there is no significant relationship between the environment where the pre-service science teachers have been brought up and their attitudes towards educational technologies. This finding concurs with the findings of Can (2010); Erol and Gezer (2006).

3.3 Findings concerning the third sub-problem

The third sub-question of the study is "Is there a significant relationship between the pre-service science teachers' attitudes towards educational technologies and their parents' educational status?" The findings concerning this problem are related to the relationship between the pre-service science teachers' attitudes and their parents' educational status. First, the distribution of the pre-service science teachers according to their parents' educational status is given in Table 3 and then the ANOVA test was carried out to determine whether there is a significant correlation between the pre-service science teachers' attitudes and their parents' educational status and then findings are presented in Table 4, Table 5, Table 6 and Table 7.

Educational status	Mother		Father	
	f	%	f	%
Graduate/Undergraduate	7	6.9	22	21.8
High school	25	24.8	29	28.7
Secondary school/Elementary school	64	63.4	50	49.5
Other	5	5.0	-	-
Total	101	100.0	101	100.0

Table 3. Distribution of the pre-service science teachers' parents' educational status

According to Table 3, 63.4% of the pre-service science teachers' mothers are secondary or elementary school graduates, 24.8% are high school graduates and 6.9% are graduates from graduate or undergraduate programs. 5.0% of them have no education or are illiterate. When we look at the educational status of the fathers, we can see that 49.5% are secondary school or elementary school graduates, 28.27% are high school graduates and 21.8% are graduates of undergraduate or graduate programs. There are no fathers not having education or are illiterate.

Educational status	N	$\overline{\mathrm{X}}$	S
Undergraduate/graduate	7	3.86	.25
High school	25	3.91	.32
Secondary school/elementary school	64	3.96	.34
Others	5	4.03	.29
Total	101	3.95	.33

Table 4. Arithmetic means and standard deviations for the pre-service science teachers' mothers' educational status

In Table 4, it is seen that there are differences among the arithmetic means. ANOVA test was carried out to determine whether these differences are statistically significant and the results of the test are presented in Table 5.

Source of the variance	Sum of squares	df	Mean of squares	F	p
Between-groups	.14	3	.05	.42	.74
Within-groups	10.75	97	.11		
Total	10.89	100			

Table 5. Anova results for the pre-service science teachers' attitude scale scores in relation to their mothers' educational status

The results of Table 5 show that there is no significant difference based on the mothers' educational status among the pre-service science teachers' attitudes towards educational technologies [$F_{(3-97)}$ = .42 , p>.05]. That is, there is no correlation between the pre-service science teachers' attitudes towards educational technologies and their mothers' educational status. This finding is supported by the findings reported by Erol and Gezer (2006).

Educational status	N	$\overline{\mathrm{X}}$	S
Undergraduate/graduate	22	3.93	.45
High school	29	3.97	.29
Secondary school/ elementary school	50	3.94	.30
Others	-	-	-
Total	101	3.95	.33

Table 6. Arithmetic means and standard deviations concerning the pre-service science teachers' fathers' educational status

Variance analysis was conducted to see whether the differences seen among arithmetic means in Table 6 are significant, and the results are presented in Table 7.

Source of the variance	Sum of squares	df	Mean of squares	F	p
Between-groups	.02	2	.01	.07	.93
Within-groups	10.87	98	.11		
Total	10.89	100			

Table 7. Anova results for the pre-service science teachers' attitude scale scores in relation to their fathers'' educational status

Anova results presented in Table 7 show that there is no significant difference based on the fathers' educational status among the pre-service science teachers' attitudes towards educational technologies [$F_{(2-98)}$ = .07, p>.05]. That is, there is no correlation between the pre-service science teachers' attitudes towards educational technologies and their fathers' educational status. This finding is in compliance with the findings of Erol and Gezer (2006).

4. Results

In today's world where information and technology are rapidly changing and developing, it is great importance for students to gain information access and problem solving skills. Therefore, integration of educational technologies into the field of education has an important role in enhancing academic achievement.

A conception of education not drawing on technological opportunities cannot meet the needs and expectations of individuals and societies of the today's world. Today, it is a must for each individual to be equipped with skills of having access to information, organizing this information, evaluating and using it and communication (Toprakçı, 2005; cited in Taşçı et al., 2010). As a result of widespread use of technological tools and devices in the field of education, a need to determine students' opinions about and tendencies and attitudes towards these tools has emerged (Akpınar, Aktamış ve Ergin, 2005; Frantom et al., 2002; Becker & Maunsaiyat, 2002; Tsai at al., 2001; McCoy, et. al., 2001; Gunter at al., 1998). In addition to this, it is assumed that the environment where students have been brought up and their parents' educational status may have some impacts on students' attitudes. In this respect, the present study investigates first-year pre-service science teachers' attitudes towards educational technologies and the effects of environment where they have been brought up and their parents' educational status on their attitudes.

In the present study, it was found that the general attitude of the pre-service science teachers' attitudes towards educational technologies is in the category of "Agree" and they have positive attitude. Moreover, it was found that the attitudes towards educational technologies do not significantly vary depending on the environment where they have been brought up. This result may indicate that whether the pre-service science teachers were brought up in rural or urban areas does not have any significant influence on their attitudes towards educational technologies. The pre-service science teachers may have been encouraged to make more use of internet through the project works or other homework

given in their former education and in this way they may have developed more positive attitudes towards educational technologies. Another finding of the present study is that there is no significant correlation between the parents' educational status and the pre-service science teachers' attitudes towards educational technologies.

But before making some generalizations in light of the findings of the present study, the limitations of the study should be mentioned. First, the present study is limited to its study group and data collection tools used in the present study. Therefore, further research may look at students from different departments, different faculties or different universities.

Utilization of educational technologies in the field of education can enrich education and enhance students' motivation, in this way; students are promoted to develop positive attitudes towards educational technologies. Positive attitudes developed by pre-service science teachers towards educational technologies may help them to make more efficient use of such technologies in their teaching.

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