Investigating the Attitudes of Pre-service Teachers Towards Technology Based on Various Variables

Sibel Suzek Birkollu [1], Yucehan Yucesoy [2], Basak Baglama [3], Sezer Kanbul [4]

[1]Near East University, Ataturk Faculty of Education, Department of Assessment and Evaluation in Education, Nicosia, Cyprus, Mersin 10, Turkey
[2] Near East University, Ataturk Faculty of Education Department of Teaching Arts, Nicosia, Cyprus, Mersin 10, Turkey
[3] Near East University, Ataturk Faculty of Education, Department of Special Education, Nicosia, Cyprus, Mersin 10, Turkey
[4]Near East University, Ataturk Faculty of Education, Department of Computer Education and Instructional Technology, Nicosia, Cyprus, Mersin 10, Turkey

*Abstract –*This study aims to investigate the attitudes of pre-service teachers towards technology based on various variables. This is a descriptive research and survey method was used. 132 pre-service teachers participated in the study and Demographic information form and Attitude towards Technology Scale were used to collect the data. Results showed that attitudes of pre-service teachers towards technology are positive and their attitudes show significant differences based on various demographic variables. Results are discussed with relevant literature and recommendations for future research and practices are also provided.

Keywords – Attitude, Technology, use of Technology in Education, Pre-service Teachers.

1. Introduction

New technological changes and innovations emerge day by day and in this regard, education system which helps societies and individuals to develop could not be considered and carried out without technology. Primary

aim of education is to teach individuals how to find and use knowledge for specific purposes. In order to achieve this aim, traditional methods might be insufficient today and at this point, educational technology comes into prominence [5], [8], [22], [23].

In the age we currently live in, knowledge is separated rapidly and individuals can reach knowledge easily and technology has an important contribution to this. Especially, structure of education system and learning-teaching practices in educational settings is shaped and varied based on technological advances and therefore teachers are expected to use technology effectively in education today [7], [11]. It is also known that use of technological tools in education has important role on academic achievement and creativity of students [6], [19].

Use of technology for instructional purposes has become very important today and therefore teachers are expected to use technology effectively and appropriately in education. Technology use in education has become important in every level of education including early childhood, secondary education and higher education [3], [21], [9]. Today, teachers encounter with student population who can easily use technology. Accordingly, when teachers fail at using current available technologies in education, they are more likely to experience various difficulties in explaining content in the curriculum to students through traditional method and materials [12]. In this respect, teachers can use and adopt technology effectively in classroom, follow the technological changes and have positive attitudes towards technology. When teachers integrate technology into education effectively, they can create new lecture plans and adopt advanced applications [1], [15]. In addition, [17] emphasized the importance of increasing teachers' awareness and skills on their roles in promoting use of technology among students both in classroom and outside of the classroom for educational purposes.

Attitude is defined as a disposition of individuals for organizing thoughts, feelings and behaviors towards a psychological object [10] and positive teacher attitudes are considered as an important predictor of successful

teaching practices. It is shown that when teachers have positive attitudes towards the use of technology, they can easily adopt and integrate technology in learning-teaching processes and practices [4]. Teacher training programs should include comprehensive education on technology for pre-service teachers to have necessary knowledge and skills for integrating technology in education and education programs need to be designed and re-organized based on requirements of using technology in education effectively [20].

Furthermore, university education is accepted as one of the important periods for pre-service teachers to receive education on technology, how to use and integrate it into their teaching practices, follow and adopt new trends and in technology. Therefore, it can be inferred that investigating pre-service teachers' attitudes towards technology and providing recommendations for the relevant field is really important since attitudes are important predictors of teaching practices. Considering the crucial role of technology in education, necessity for the teachers to be competent in using and integrating technology into education and the crucial role of positive attitudes in using technology in education, the present study aims to investigate attitudes of pre-service teachers towards technology based on various variables. In line with this general aim, answers to the following questions were sought in this study:

1. What is the level of pre-service teachers' attitudes towards technology in general?
2. Do pre-service teachers' attitudes towards technology differ with respect to their age, gender, department and class level?

2. Method

2.1. Research Model

This is a descriptive study which aims to investigate pre-service teachers' attitudes towards technology based on various variables in which survey method was used as research method. Survey method is a research model in which a past or an existing event or a situation is revealed or described in the way it exists or existed [13]. In survey research method, researchers have the opportunity to explore characteristics of a situation, seek explanation and make deep inferences about a population [14].

2.2. Participants

Participants of the study included a total number of volunteer 132 pre-service teachers studying at Faculty of Education in Near East University, North Cyprus. Participants were determined based on simple random sampling. Simple random sampling is a method of selection of a sample in which each sampling unit in the population has an equal probability of being selected [18].

Table 1. Demographic characteristics of the participants

Demographic characteristics		f	%
Gender	Male	64	48.5
	Female	68	51.5
	Total	132	100
Department	Teaching Individuals with Mental Disability	40	30.3
	Classroom Teaching	18	13.6
	Pre-school Teaching	24	18.2
	Guidance and Psychological Counseling	16	12.1
	Music Education	17	12.9
	Computer Education and Instructional Technologies	17	12.9
	Total	132	100
Average hours of computer use per day	Less than one hour	34	25.8
	1- 4 hours	62	50.0
	5 hours and above	32	24.2
	Total	132	100
Self-perception ratings for the use of technology for educational purposes	Good	18	13.6
	Average	72	54.5
	Bad	42	31.8
	Total	132	100

The demographic characteristics of the participants are shown in Table 1. As it can be seen, 64 participants (48.5%) are male and 68 of them (51.5%) are female. In addition, 40 participants (30.3%) are studying at the department of Teaching Individuals with Mental Disability, 18 participants are studying Classroom Teaching (13.6%), 24 of them (18.2%) are studying Pre-school Teaching, 16 of them (12.1%) are studying Guidance and Psychological Counselling, 17 of them (12.9%) are studying Music Education and 17 of them (12.9%)

are studying Computer Education and Instructional Technologies. 34 participants (25.8%) reported that they use computer for less than one hour during a day and 31 of them (24.2%) reported that they use computer for 5 hours and above. Half of the participants indicated that they use computer for between 1 and 4 hours during a day. When the participants were asked to rate themselves on the use of technology for educational purposes, 18 participants reported themselves as good (13.6%), 72 of them reported as average (54.5%) and 42 of them reported as bad (31.8%).

2.3. Data Collection Tools

Demographic information and Technology towards Attitude Scale were used to collect the data in the study. Demographic information form included questions on pre-service teachers' age, gender, department and class level. Questions on total hours of daily computer use, having computer/laptop, tablet and smart phone, having internet connection at home, attending a course on computer and technology before and perceived competence on using technology for educational purposes were also asked in the demographic information form.

Attitudes towards Technology Scale was developed by [26] which assesses attitudes towards using technology in education. The scale includes 19 statements and each item is rated on a 5-point Likert scale ranging from "Strongly Agree" (5), "Agree" (4), "Undecided" (3), "Disagree" (2) and "Strongly Disagree" (1). There are 19 positive and 6 negative statements in the scale Cronbach Alpha reliability coefficient of the scale calculated as 0.87. The scale consists of five factors including "using technological tools in education", "not using technological tools in education", "effects of technology on educational life", "teaching how to use technological tools" and "evaluation of technological tools". The highest score which can be obtained from the scale is 71 and the lowest score is 43. The highest score which can be obtained through responding as "undecided" is 57 and it means being neutral to the situation. In other words, scores higher than 58 refer to positive attitudes and scores lower than 56 refer to negative attitudes.

Data of the study were collected during the lecture hours and it took pre-service teachers approximately 15 minutes to complete the questionnaires.

2.4. Data Analysis

Data of the study were analyzed with SPSS 20 program. Significance level was considered as $p < .05$ in statistical analysis. Percentage, frequency, t-test, ANOVA, Mann-Whitney U tests were used in data analysis.

3. Results and Discussion

Results obtained from the study are provided in this section in line with the general aim and research questions.

Table 2. Pre-service teachers' attitudes towards technology based on gender

	Gender	N	$\overline{x}$	SS	sd	t	p
Attitudes towards technology	Male	Male	64	4.10	.41471	117.396	2.852
	Female	Female	68	3.86	.54632		

3.1. T-test analysis results of pre-service teachers' attitudes towards technology based on gender

As it can be seen from Table 2., mean and standard deviations of female pre-service teachers' attitudes towards technology were calculated as (=4.10, SS=.414) and male pre-service teachers' were found as (=3.86, SS=.546). It was revealed that attitudes towards technology significantly differ based on gender. In contrast with these results, it is revealed that self-efficacy perceptions of male teachers towards computer are higher compared to female teachers' self-efficacy perceptions towards computer [7].

3.2. T-test analysis results of pre-service teachers' attitudes towards technology based on attending a course on computer and technology before or not

Table 3. Pre-service teachers' attitudes towards technology based on attending a course before or not

Attitudes towards technology	Attending a course before or not	N	$\overline{X}$	SS	sd	t	p
	Yes	43	4.17	.36855	113.136	3.038	.003[*]
	No	89	3.90	.52639			

As it can be seen in Table 3., mean and standard deviations of attitudes towards technology of pre-service teachers who attended a course before were calculated as ($\overline{x}$=4.17, SS=.368) and attitudes of pre-service teachers who did not attend a course before were found as ($\overline{x}$=3.90, SS=.526). It was figured out that attitudes towards technology significantly differ based on attending a course before. It is seen that there are contradictory findings in the literature. In a study, attitudes of pre-service teachers who received course on computer towards computer-supported instruction are higher than pre-service teachers who did not receive course on computer before [2]. However, in another study, no significant difference between the attitudes of pre-service teachers and receiving a course on computer before or not were found [16].

Table 4. Pre-service teachers' attitudes towards technology based on department variable

Dimension	Department	N	$\overline{x}$	SS
Attitudes towards technology	Teaching Individuals with Mental Disability	40	3.84	.42290
	Classroom Teaching	18	4.11	.39670
	Pre-school Teaching	24	4.08	.34496
	Guidance and Psychological Counseling	16	3.30	.48309
	Music Education	17	4.32	.33507
	Computer Education and Instructional Technologies	17	4.40	.23898
	Total	132		

3.3. Descriptive statistics on pre-service teachers' attitudes towards technology based on department variable

Table 4. shows descriptive statistics on pre-service teachers' attitudes towards technology based on department variable. It was found that attitudes of pre-service teachers towards technology are positive and they mostly responded as "Agree".

Table 5. One-way ANOVA test results of pre-service teachers' attitudes towards technology based on department variable

Attitudes towards technology		Sum of Ranks	sd	Mean Rank	t	p
	Between groups	13.554	5	2.711	18.295	.000[*]
	Within groups	18.670	126	.148		
	Total	32.224	132			

3.4. One-way ANOVA test results of pre-service teachers' attitudes towards technology based on department variable

One-way ANOVA test was applied to figure out in which departments the attitudes of pre-service teachers towards technology significantly differ and the results are provided in Table 5. As it can be seen from the table, there is significant difference between pre-service teachers' attitudes towards technology based on department variable. It was also found that there is a significant difference between Guidance and Psychological Counseling and Computer Education and Instructional Technologies in favor of the department of Computer Education and Instructional Technologies. Besides, asignificant difference was observed between Guidance and Psychological Counseling and Music Education in favor of the department of Music Education. However, [24] showed that self-efficacy beliefs on computer use of pre-service teachers do not show significant difference based on department.

3.5. Mann-Whitney U test results of pre-service teachers' attitudes towards technology based on class level variable

Table 6. Mann-Whitney U test results on of pre-service teachers' attitudes towards technology based on class level variable

Variable		n	Mean rank	Sum of ranks	M-Whitney U	z	p
Class level	Second year	29	32.98	956.50	521.500	-2.695	.007*
	Third year	56	48.19	2698.50			
Class level	Second year	29	25.81	748.50	313.500	-3.242	.001*
	Fourth year	40	41.66	1666.50			

Since the sample is not normally distributed, Mann-Whitney U which is a non-parametric was applied in order to determine whether attitudes of pre-service teachers significantly differ based on their class level variable. As it can be seen from Table 6., it was found that there is significant difference between attitudes of technology and class level in favor of third year students. In addition, a significant difference was observed between second year students and fourth year students in favor of fourth year students in terms of their attitudes towards technology.

Table 7. Mann-Whitney U results on attitudes towards technology based on average hours of computer use per day

Variable		n	Mean rank	Sum of ranks	M-Whitney U	z	p
Average hours of computer use per day	Less than one hour	34	34.59	1176.00	581.000	-3.940	.000*
	1 – 4 hours	66	58.70	3874.00			
Average hours of computer use per day	Less than one hour	34	25.65	872.00	227.000	-3.428	.001*
	5 hours and above	32	41.84	1339.00			

3.6 Mann-Whitney U test results of pre-service teachers' attitudes towards technology based on average hours of computer use per day

Table 7. provides information on Mann-Whitney U test results of pre-service teachers' attitudes towards technology based on average hours of computer use per day. As it can be seen, there are significant differences based on pre-service teachers' attitudes towards technology and average hours of computer use per day in favor of pre-service teachers who use less than one hour and 5 hours and above. This result is supported with findings from the literature. In a research carried out with pre-school teachers, it was found that teachers who frequently use computer at home also have positive attitudes towards computer and information technologies [25].

4. Conclusion and Recommendations

In conclusion, results of the present study showed that attitudes of pre-service teachers towards technology are positive and significant differences were obtained between various variables and attitudes towards technology among pre-service teachers. It is expected that this study would provide an insight for further research and practices in the relevant field. In the light of the results obtained from the study, the following recommendations for further research and practices are provided:

- The number of lectures on technology might be increased in teacher training programs to increase knowledge and skills for pre-service teachers to use during their professional life.
- Seminars, courses and conferences on technology might be organized for pre-service teachers.
- Similar studies with qualitative or experimental research design might be carried out to provide a deeper understanding for what factors are associated with attitudes of pre-service teachers towards technology.

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