DEVELOPING AN ATTITUDE SCALE TOWARDS USING INSTRUCTIONAL TECHNOLOGIES FOR PRE-SERVICE TEACHERS

Mustafa METİN,
Artvin Çoruh University, Faculty of Education, Artvin, Turkey;
mustafametinae@hotmail.com

Gül KALELİ YILMAZ,
Bayburt University, Faculty of Education, Bayburt, Turkey;
gulkaleliyilmaz@hotmail.com

Kerem COŞKUN
Artvin Çoruh University, Faculty of Education, Artvin, Turkey;
keremcoskun1979@hotmail.com

Salih BİRİŞÇİ
Artvin Çoruh University, Faculty of Education, Artvin, Turkey;
saleyh@hotmail.com

ABSTRACT
The aim of this study is to develop an attitude scale towards using instructional technologies (USIT) for pre-service teachers. The research was carried out with 1235 pre-service teachers that 567(45.9%) were freshman; 401 (32.5%) were sophomore; 151 (12.2%) were junior and 116 (9.4%) were senior students at different universities in Turkey. The study consists of five parts including literature review, item pool, experts' opinions, administration of scale and computing the reliability and validity. While constituting the item pool, an interview was carried out with 15 pre-service teachers related to instructional technologies. Among from 55 items which are directly related with the subject of attitude or which are selected from the relevant interviews. 45 of them were edited by expert opinions the five point likert type. The draft scale was administered to 1235 pre-service teachers. As a result of factor analysis, the number of items was reduced to 37. After carring out factor analysis the Cronbach-Alpha internal integrity coefficient of the final version of the scale was found as 0.949. By computing the reliability of USIT, the scale was ready to be used.

INTRODUCTION

Education and technology are two key elements having an important role in human's life. The aim of the education is to help the people to know and find themselves (Başaran, 1994). Education is not preparation for life, it is the same of life (Varış, 1991). Technology helps individuals to take advantages of their knowledge and skills more effectively and efficiently. Technology is the discipline which consists of gathering machine, process, method, system, management, control system and bridges between science and applications (Alkan, 1998).

Nowadays technology has changed and developed quickly and by the way the place of technology in education system has expanded. Thus, using technology in education has become popular field and the field of science has been called '*Educational Technology'*. In literature there are a lot of definitions related to educational technology. Alkan (1998) has described educational technology as a whole system consisted of personnel, instruments and methods in order to apply educational technologies effectively and positively. Besides; educational technologies deals with how they can fulfil these. Teachers' roles are to create an effective, efficient atmosphere and a multimedia environment with the help of technologies. These environments are important for teacher-student interaction and communication. For this; teacher should use technological materials addressed both eyes and ears in learning and teaching process. Moreover; educational technology examines the reasons of students' failures, makes analysis and develops the precautions which can increase the success level and deal with the problems of education in rational and scientific way (Koşar et al. 2003).

Educational technology and instructional technology sometimes can be used one for another (Yalın, 2004). However; there are differences between educational technology and instructional technology. Educational technology is a process which makes systematic analysis of problems and develops suitable designs by the help of materials, technical, knowledge, manpower to find solutions for these problems. Instructional technology is related to technology, as teaching is sub branch of education and it consists of arranging the disciplines according to specific characteristic, for example; science teaching technology. In other words educational technology emphasizes the discipline of learning-teaching process, on the other hand; instructional technology expresses guidance activity for any subject during teaching (Alkan, 1998).

In present days, instructional manner mentality has changed from traditional teaching to modern teaching supported by the technological materials. In order to use technology in education it has become compulsory. The materials used in education can address most of the sense organs of students so that the subjects can be learned more meaningfully and efficiently. Furthermore; using technology during lessons excite students' attention and creates desire and exciting atmosphere. In order to use instructional technology in educational process effectively, some teaching aims should be known very well. These are defined by Sarıtaş (2007) as taking students' attention; arousing students' interest; developing students' attitude to the lesson on positive way; going away from teacher centered process and making the students active in the class; presenting the knowledge in various ways to students who have many different learning styles; learning easy by visualizing and concreting; individualizing education; spreading the education into larger groups. When these aims are taken into consideration, it can be achieved that each student can take advantages of educational process equally. As it is known, every individual has different interest and needs so each individual has typical learning styles. Using instructional technology during lesson, it can be managed to give close attention to individual differences and give opportunity to learn equally for each individual.

Instructional technologies not only make teachers' job easier but also impose a responsibility on them. That is because; new technology has always changed the instructional programme, learning-teaching process, the learning styles of the students so that teachers have to adapt to that change (Rose and Mayer, 2000). ISTE "International Society for Technology in Education" has developed standards for students, teachers and managers. ISTE (2004) states that according these standards; teachers' responsibility are to know the basic process and concepts; to plan designed environment supported by technology and apply; to use different assessment strategies supported by the technology; to follow the career development, technological changes and improve themselves; apply the social, ethnical, legal and humanistic principles related to the usage of instructional technology. As it is known; to educate the teachers about basic knowledge, skills, tendency about gaining abilities which gives them opportunity to benefit from technological devices more effectively. Therefore it is needed to have scale whose reliability and validity has been tested to observe or to measure the basic technological sufficiency of teachers (Flowers and Algozzine, 2000).

When the literature is examined, it was seen many researcher related to technology, educational technology and technological tolls.

Study of Akkoyunlu (1996) was dictated that there was a meaningful relationship between pre-service teachers' knowledge about technology and their attitude towards technology. The researcher also reveals that pre-service teachers equipped with more information about technologies have more positive attitude towards the use of technologies in teaching and learning environments. Akbaba (2001) aimed to determine the attitudes of the primary school children towards technology and computer experiences and their relationships. As a result of study, students expressed positive feelings toward technology and its applications, although the students were indecisive about the usage of technology. It was found no significant difference between the computer experiences and basic attitudes of the students towards technology. Another study was carried out by Akpınar et al. (2005). Aim of this study was to determined students' attitudes towards the use of technology in elementary education and to extent usage of technological materials in science courses. As a result, researchers have found significant differences between state and private schools and also between the school type and the students' attitudes towards the extent to the usage of technology in lessons. The aim of Yılmaz's (2005) study was to evaluate the effects of technology usage on students' achievement and attitudes in work. Researchers found that technological materials have positive impacts on students' achievement and attitudes. Besides, Demirel (2005) revealed that utilization of instructional technology in teaching-learning processes provides more effective presentation; moreover, it makes instruction more meaningful and enjoyable. Besides, teachers should acquire the quality of technology literacy to offer students rich learning environments integrated with new technologies. Then, teachers should learn how to integrate technology with learning environments. In addition to this, in Pala's study (2006) determined primary teachers' attitudes towards educational technologies. It has been found that the teachers' attitudes towards educational technology are positive. Furthermore there was no significant difference in teachers' attitudes towards educational technologies in respect to the different variables such as genders, ages, schools serviced and periods of service. Furthermore, Yavuz and Coskun (2008) investigated pre-services teachers' attitudes toward the utilization of technological tools. This study revealed that the technology-assisted project studies affected students' attitudes toward the utilization of technology in education positively. In addition to these researchers, Özgen and Obay (2008) investigated the attitudes of prospective teachers of secondary mathematics towards educational technology in respect to the some variables. According to the results, it was seen that the attitudes of prospective teachers towards educational technology didn't differ according to the gender variable, but it was found significant difference between class and their attitudes. In addition to this, it was determined that prospective secondary mathematics teachers had positive attitudes

towards educational technology. Another study was carried out by Friedman et al, (2009). Friedman et al. (2009) investigated beliefs, practices, and the efficacy of social studies faculty members from the United States in terms of instructional technology usage. According to results, familiarity with the National Educational Technology Standards, as well as confidence with technology are related to the frequency and type of technology that social studies faculty members utilize in their courses. Besides, Can (2010) investigate that the attitudes of the pre-service teachers towards the effects of use of teaching materials; overhead projector and projector on learning. As a result of study, pre-service teachers believed that the use of overhead projector and projector brings some kind of change and variety to the teaching, saves teaching from being monotonous, and contribute to establishing lively, colourful and smooth setting for teaching and learning. Additionally, Beşoluk, Kurbanoglu and Onder (2010) were carried out a study related to usage of educational technology in the lesson. According to result of study, pre-service and in service teachers statistically differ with respect to current knowledge in the ways and in-service teachers with over 15 years experience have the lowest knowledge about using computers. In addition to many science teachers and pre-service science teachers realize the importance of technology usage and they desire to have more knowledge about educational technology.

In addition to these studies, many researchers were interested in developing reliable and comprehensive attitude scale towards the use of computers .Some of these scale are: The Attitudes Toward Computers (Raub, 1981), The Computer Use Questionnaire (Griswold, 1983), The Attitude Toward Computer Scale (Francis, 1993), The Computer Attitude Measure (Kay, 1993), The Computer Attitude Questionnaire (Knezek and Miyashita, 1993) and The Computer Attitudes Scale for Secondary Students (Jones and Clarke,1994). Furthermore, some attitude scale towards technology was developed by researchers: For example; Page et al (1979) developed a Likert-type scale of 40 items in order to evaluate the attitudes of students towards science and technology. This scale consisted of four subscales, namely, technology, technical education, its industrial position and attitude towards technology. Furthermore, Frantom et. al., (2002) developed a scale regarding children's attitudes towards technology. The scale was administered with 574 students. The attitude scale consisted two-factor scale including interests/aptitudes and alternative preferences. Besides, Öksüz et al (2009) have developed a measuring tool with 73 items in their study called "A perception scale for technology use in the teaching of elementary mathematics". After analyse of scale; it was determined that this scale can be used in education as it is valid and reliable.

When the literature is investigated, it is seen that there are studies to determine the attitude of technology, computer, but the studies related to the attitude of instructional technology are limited. However; the in-service and pre-service teachers' attitudes about instructional technology are directly related to usage of technology. Thanks to an effective scale prepared for investigating the instructional technology, pre-service teachers' attitudes can be identified and the teachers' negative attitudes and the reasons of their attitudes can be found and with different activities the negative attitudes can be resolved.

From this point of view; the aim of this study is to develop a scale regarding using instructional technology.

METHODOLOGY

In this study, an instrument was developed to define pre-service teachers' attitude towards using instructional technology. This instrumental development study was realized in the spring semester of 2009 academic years with the participation of 1235 pre-service teachers selected from different university in Turkey.

Sample

The sample of study consists of 1235 undergraduate that are chosen from seven universities' Faculty of Education in Turkey. Demographic information of the sample was given in Table 1.

Table 1: Demographic information of the sample

		Frequencies (f)	Percentage (%)
Gender	Male	517	41,9
	Female	718	58,1
Grade	Freshman	567	45,9
	Sophomore	401	32,5
	Junior	151	12,2
	Senior	116	9,4
Department	Primary Teacher Education	617	50,0
	Science Teacher Education	228	18,5
	Mathematics Teacher Education	188	15,2
	Social science Teacher Education	202	16,4

Sample of research consists of 517 (41.9%) male, 718 (58.1%) female pre-service teachers. It was determined that 567(45.9%) of them were freshman; 401 (32.5%) of them were sophomore; 151 (12.2%) of them were junior and 116 (9.4%) of them were senior students. Besides, it was seen that 617 of pre-service teachers were in Primary Teacher Education, 228 of them were in Science Teacher Education, 188 of them were in Mathematics Teacher Education and 202 of them were in Social science Teacher Education department.

Development Process of Attitude Scale towards Using Instructional Technology

Using instructional technology attitude scale is a five point likert scale used to collections of data from pre-service teachers. It was followed five stages in the development of the scales.

In the first stage: so many attitude scales towards using instructional technology were examined in order to determine the statements of instructional technology attitude scale and how to develop an attitude scale (Page et al 1979; Knezek and Miyashita, 1993; Francis, 1993; Frantom et al, 2002; Öksüz et al, 2009; Flowers and Algozzine, 2000; Rose and Mayer, 2000; Selwyn, 1997; Akkoyunlu et al, 2005; Çakıroğlu et al, 2008; Beşoluk et al, 2010; Can, 2010; Pala, 2006; Yavuz and Coskun, 2008; Yılmaz, 2005; Metin, 2010; Metin and Özmen, 2008). It was also carried out semi-structured with 15 pre-service teachers to determine their perceptions on the instructional technology. Interviews were held in a place where the pre-service teachers felt themselves comfortable and explained anything without hesitation. Each interview was recorded and finished within 20 minutes at a single session. In order to define perceptions of the pre-service teachers, they were asked, extra questions such as *"why", "how", "what do you mean exactly and explain"*: the four main questions were as a follow: *1) Do you think that instructional technologies have any positive effect? Please explain. 2) Do you think that instructional technologies have any negative effect? Please explain. 3) Do you think about using instructional technologies in the lessons? Please explain 4) Do you have enough knowledge about usage of instructional technologies in the lesson? Please explain.* After interview was analyzed, it was consisted items of attitude.

In the second stage: After interview and reviewing, item pool consisting of 55 statements about using instructional technology was developed. There are 28 positive and 27 negative statements in item pool of draft attitude scale. These statements were placed together which seemed to reflect an underlying theme, a process which resulted in three sets each comprising 55 items, preliminary indicators of possible scales. After deciding an initial item pool was generated 55 items on a five point rating scale such as "*strongly disagree*", "*disagree*", "*undecided*", "*agree*" and "*strongly agree*".

In the third stage: for the purpose of content validation, initial draft of the attitude scale with 55 items on a five point rating scale was given to a group of five experts in instructional technology, educational psychology, and educational measurement for taking their opinions about whether the selected items were valid items for assessing pre-service teacher' attitudes toward using instructional technology. The experts were asked to examine items with regard to their relevance purpose of the attitude, content coverage, understandability and consistency among one another. Having received feedback from experts, ten items were deleted because they are not suitable for unclear item and students' level. As a conclusion, attitude scale towards instructional technology consists of 26 positive and 19 negative items on five point rating scale.

In the fourth stage: Final draft of the attitude scale with 45 items was administered to 1235 pre-service teachers for calculating validity (particularly construct validity) and reliability of the attitude scale. Pre-service teachers' responses were entered an excel file created for further analyses.

In the last stage: The data collected from 1235 pre-service teachers were analyzed by means of factor analysis and reliability analysis through the use of SPSS 11.5. Firstly, for the validity of the USIT, it was calculated means and standard divisions of upper 27% (333 pre-service teachers) and lower 27% (333 pre-service teachers) points and t-tests between items' means of upper 27% and lower 27% points. In addition to the data were subjected to factor analysis with principle component method in order to examine the factor structure behind the attitude scale. The principal components factor analysis was followed by varimax rotation (rotated component matrix). I thought that the variance explained by one factor that would be independent of the variance in the other factors. Secondly, reliability analysis was performed for each of the emerged sub-scales and Croanbach alpha correlation coefficients were used. Then, Croanbach alpha correlation coefficients were calculated among these factors.

Findings

After attitude scale towards using instructional technology was administered to pre-service teachers, the

suitability of the current data for factor analysis was checked through several criteria. First, 1235 participants were found to be sufficient for factor analysis according to several resources (Field, 2000**;** Pallant, 2001; Tabachnick and Fidell, 2007). Second, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Barlett's test was checked. The Kaiser–Meyer Olkin (KMO) measure of sampling adequacy (KMO) and Barlett's test were calculated to evaluate whether the sample was large enough to apply a satisfactory factor analysis and examine to determine appropriateness of factor analysis (Büyüköztürk 2003). The KMO value varies between 0 and 1. A value close to 1 indicates that patterns of correlations are compact, and factor analysis will yield reliable factors (Akbulut et al, 2010; Kline, 1994). KMO values of .60 or above are acceptable (Pallant, 2001; Kline, 1994; Tabachnick and Fidell 2007; Hair, et al., 1998, George and Mallery 2001). The KMO value of the initial analysis was .965, which is considered perfect by Hutcheson and Sofroniou (1999). The Bartlett's Test of Sphericity reached a significant value supporting the factorability of the correlation matrix obtained from the items [Approx. Chi-Square: 20260.196 (p< 0.01)]. According to results Barlett's test of Spherincity statistic was significant. Results of KMO and Barlett's test appear to support the validity of the factor analysis usage for this study. Third; it was carried out item analysis of the scale. It was calculated means and standard divisions of upper 27% and lower 27% points and P value and t-tests between items' means of upper 27% and lower 27% points in item analysis of the scale for validity of the USIT items. It was determinate unsuitable items in the scale.

After these applications, item analysis and exploratory factor analysis was conducted to data gathered from the attitude scale.

Item Analysis of the Scale

Before the exploratory factor analysis, means and standard divisions of upper 27% and lower 27% points and P value and t-tests between items' means of upper 27% and lower 27% points in item analysis of the scale were calculated in order to validity of the USIT items. Table 2 presents means, standard divisions, P value and t-tests between items' means of upper 27% and lower 27% points in item analysis of the scale

As seen in table 2, the t-test results showed significant differences between each item's means of upper 27% and lower 27% points except from items 4, 8, 19, 24 and 34. According to this result, 40 items of USIT is appropriate to measure undergraduates' attitude regarding instructional technologies.

Table 2. Means standard divisions, P value and t-tests means of upper and lower points

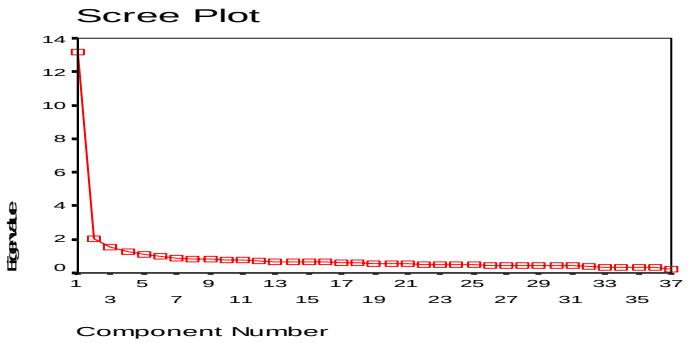
Item	Upper		Lower				Item	Upper		Lower			
No	$\bar{x}$	SD	$\bar{x}$	SD	t	p	No	$\bar{x}$	SD	$\bar{x}$	SD	t	p
1	4,67	,601	2,79	1,428	22,10	,000	**24**	3,17	1,35	2,90	1,295	2,55	**,281**
2	4,52	,624	2,77	1,290	22,27	,000	**25**	4,49	,722	2,73	1,267	22,01	,000
3	4,47	,687	2,85	1,201	21,38	,000	**26**	4,28	,735	2,63	1,210	21,33	,000
4	3,41	1,21	2,36	1,162	11,47	**,977**	**27**	4,78	,496	2,74	1,327	26,30	,000
5	4,43	,707	2,86	1,231	20,16	,000	**28**	4,23	1,16	2,79	1,300	15,03	,000
6	4,43	,723	2,70	1,198	22,60	,000	**29**	4,54	,632	2,89	1,294	20,93	,000
7	4,66	,647	2,74	1,296	24,10	,000	**30**	4,32	,725	2,69	1,251	20,62	,000
8	2,73	1,32	2,71	1,309	,236	**,939**	**31**	4,64	,674	2,84	1,305	22,39	,000
9	4,47	,887	2,83	1,263	19,46	,000	**32**	4,69	,660	2,84	1,336	22,69	,000
10	4,53	,647	2,80	1,229	22,77	,000	**33**	4,45	,682	2,84	1,287	20,09	,000
11	4,17	1,19	2,81	1,277	14,20	,000	**34**	3,82	1,27	2,82	1,328	9,93	**,104**
12	4,01	1,04	2,80	1,250	13,51	,000	**35**	4,67	,680	2,69	1,221	25,80	,000
13	4,41	,618	2,77	1,287	20,92	,000	**36**	4,59	,734	2,75	1,271	22,81	,000
14	4,39	,665	2,76	1,241	21,13	,000	**37**	4,55	,800	2,67	1,244	23,16	,000
15	4,59	,587	2,94	1,359	20,36	,000	**38**	3,54	1,44	3,00	1,340	4,99	,002
16	4,34	,861	2,72	1,224	19,73	,000	**39**	4,71	,608	2,77	1,322	24,28	,000
17	4,51	,739	2,68	1,228	23,37	,000	**40**	3,85	1,15	2,70	1,217	12,50	,003
18	4,25	,721	2,83	1,252	17,94	,000	**41**	3,84	,950	2,71	1,267	13,08	,000
19	3,56	1,23	2,67	1,246	9,233	**,802**	**42**	4,04	1,13	2,77	1,239	13,83	,000
20	4,69	,595	2,99	1,345	21,05	,000	**43**	4,44	,944	2,64	1,253	20,99	,000
21	4,52	,739	2,76	1,213	22,61	,000	**44**	4,72	,623	3,13	1,445	18,45	,000
22	4,17	,767	2,63	1,224	19,46	,000	**45**	4,75	,635	3,35	1,399	16,66	,000
23	4,26	,980	2,72	1,228	17,90	,000							

$\bar{x}$: Means, SD: Standard divisions, P<0.01

Exploratory Factor Analysis of the Scale

Exploratory factor analysis allows researchers to determine if many variables can be described by few factors; it reduces attribute space from a larger number of variables to a smaller number of factors (Fraenkel & Wallen, 1996). The aim of exploratory factor analysis is to find the number of separate components that may exist for a group of items (Kline, 1994; Büyük Öztürk 2003). In this study, the purpose of the exploratory factor analysis was to investigate the factors underlying the USIT. The data obtained from the analysis of this study was begun by examining the dimensions of data obtained from the analysis. So, the exploratory factor analysis was administered the 40 items. The Principle components factor analysis was used for all the data in order to extract the appropriate number of factors. The initial solution revealed that six factors had an eigenvalue greater than 1.These factors altogether explained 51.2% of variance of results. Overall, five of six factors were represented just by one item per each factor with loading higher than 0.4. Thus remaining one factor was considered not interpretable. Three items were deleted because their factor loadings were lower than 0.4 (Kline, 1994; Büyük Öztürk 2003). Three out of 40 attitude items were deleted and the factor analysis for rotation was run again over the data set with 37 items. Then, Varimax rotation was used. After using varimax rotation, the factor loadings for each item were examined. Loadings of less than 0.40, a commonly-used cut-off, were eliminated. Thus, the factor analysis resulted in five independent factors with factor loadings greater than 0.4.

However, Kline (1994) highlighted that this method of determining the number of factors can overestimate the number of factors. There are various criteria for determining how many factors to attain (Dunteman, 1989). They are: Eigenvalues statistics, Scree test, total variance percentage method, Joliffe criteria, explained variance criteria, and determining the number of factors by the researchers. It was used an alternative approach to determine the appropriate number of factors is to examine the scree plot produced by the analysis in study. It was seen scree plot to determine number of factors (Kline, 1994).



Scree plot shows that five factors were in sharp descent and then started to be level off. This was evidence that rotation was necessary for 5 factors. Each two methods of determining the number of factors was revealed that attitude scale towards using instructional technology consists of five factors. Table 3 present Eigenvalues, variances and total variances of the five factors

Table 3: Eigenvalues, variances and total variances of the five factors

Factors	Eigenvalues	Percentages of variances	Percentages of total variances
Factor 1	5,054	13,660	13,660
Factor 2	4,284	11,579	25,239
Factor 3	4,066	10,988	36,227
Factor 4	3,701	10,002	46,229
Factor 5	2,046	5,531	51,759

As seen in table 3, there are five factors in attitude scale. Eigenvalues of the factors are 5.054, 4.284, 4.066, 3.701 and 2.046. Factor 1 explained 13.660 % of total variance, factor 2 explained 11.579 % of total variance, factor 3 explained 10.998 % of total variance, factor 4 explained 10.002 % of total variance and factor 5 explained 5.531 % of total variance. These five factors explained 51.759% of total variance and were named according to the common characteristics of the items loaded on the same factor. This value is appropriate for considering other works focused on attitudes showed lower explained variance (Spinner and Fraser 2005**:** 42%, Kline 1994: 41%). According to results of item loading and Eigenvalues of the factors, it is said that this attitude scale is appropriated to assess attitude scale towards using instructional technology.

After it was determined the factor numbers of USIT, it was seen distribution of 37 items to five factors. Table 4 presents factor loadings and factor structures of the items.

Table 4: Factor Structures and Loadings of the 37 Items in USIT

Number of Items		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
2	I enjoy using the instructional technologies in lesson	,727				
1	Usage of the instructional technologies increases clarity of lessons	,700				
5	I learn better the lesson when instructional technologies use	,662				
6	I feel motivated the lesson used instructional technologies	,638				
10	I am pleased with the lesson used instructional technologies	,597				
3	I am bored when instructional technologies are used in lessons	,579				
14	I can listen carefully to the lesson used instructional technologies	,536				
13	I learn swiftly topics when instructional technologies are used	,528				
7	I am not interested to use instructional technologies in the lesson	,517				
9	I learn difficultly the lesson used instructional technologies	,469				
22	I enjoy being in the environments talking about instructional technologies		,649			
41	I delighted in reading the books explaining the instructional technologies		,626			
30	I feel myself more comfortable in the lessons used instructional technologies		,605			
18	I become active in the lessons used instructional technologies		,561			
26	I make effort to learn new instructional technologies		,542			
33	I remember the knowledge easily through lesson used instructional technologies		,542			
36	Usage of the instructional technologies in lessons increases learning		,528			
29	The knowledge learnt during the lessons by using instructional technologies are more permanent		,495			
25	My creativity increase in lessons used instructional technologies		,464			
42	Teachers are passive when instructional technologies were used in lessons			,680		
37	Students' achievement are not affected from usage of instructional technologies in lessons			,622		
39	Usage of the instructional technologies is unnecessary			,600		
27	It is a waste of time to use instructional technologies in lessons			,580		
31	I avoid using the instructional technologies in my classes			,546		
43	I dislike the topics that are told with the instructional technologies			,512		
16	I dislike talking about improving instructional technologies			,491		
21	I lose my concentration in the lesson used instructional technologies			,426		
23	I do not want to learn new improvements in instructional technologies			,409		
28	I do not know how to use computers in my lessons				,628	
32	I do not want to use computers and the internet in my classes.				,589	
35	I do not want to participate in lessons teaches by instructional technologies				,554	
20	I can make a search about anything in my lesson on the internet				,546	
15	I can benefit from the opportunities of computers in my lessons				,511	
11	I am stressed in the lesson used instructional technologies				,428	
17	I learn slowly in the lesson used instructional technologies				.402	
44	It is beneficial for me to learn the usage of the instructional technologies					,681
45	Usages of the instructional technologies are made more prevalent in education					,677

As seen in table 4, factor loading of items in the scale changes between 0.402 and 0.727. Kline (1994) said that the value of factors load between 0.30 and 0.60 is medium and between 0.6 and 1.0 is high quality. This situation indicated that 37 of item are enough qualified in the scale.

It is seen the distribution of 37 items to five factors, factor 1 includes ten items: 1, 2, 3, 5, 6, 7, 9, 10, 13 and 14. These items explicitly measures pre-service teachers' attitude towards belief regarding the usage of instructional technology in lesson. Therefore; this factor was named as ''belief regarding usage of instructional technology in lesson (BRUIT)". Factor 2 includes nine items: 18, 22, 25, 26, 29, 30, 33, 36 and 41. These items explicitly measure pre-service teachers' attitude towards appreciation to the usage of instructional technology in lesson. This factor was named as "Appreciation to usage of instructional technology in lesson (ASIT)". Factor 3 includes nine items: 16, 21, 23, 27, 31, 37, 39, 42 and 43. These items explicitly measure pre-service teachers' attitude towards unappreciated to instructional technology. This factor was therefore named as "Unappreciated using instructional technology (UPIT)". Factor 4 includes seven items: 11, 15, 17, 20, 28, 32 and 35. These items explicitly measure pre-service teachers' attitude towards disinclination to make use of instructional technology. This factor was therefore named as "Disinclination to make use of instructional technology (DMIT)". Factor 5 includes two items: 44 and 45. These items explicitly measure pre-service teachers' attitude towards belief in usefulness of instructional technology. This factor was therefore named as "Belief in usefulness of instructional technology (BUIT)".

Reliability of the attitude scale

Reliability analysis was performed for each factor and croanbach alpha correlation coefficients were used. Then, croanbach alpha correlation coefficients were calculated among these factors. Table 5 summarizes factor names, number of the items and reliability of each factor.

Table 5 Factor names, number of the items and croanbach alpha value of each factor

Factors name	Number of items	Coefficient items Cronbach Alpha
Believe regarding usage of instructional technology in lesson (BRUIT)	10	0.892
Appreciation to usage of instructional technology in lesson (ASIT)	9	0.849
Unappreciated using instructional technology (UPIT)	9	0.847
Disinclination to make use of instructional technology (DMIT)	7	0.791
Believe in usefulness of instructional technology (BUIT)	2	0.758
Total Scale	37	0.949

As seen in table 5, it was determined that croanbach alpha value of BRUIT is 0.892, ASIT is 0.849, UPIT is 0.847, DMIT is 0.791 and BUIT is 0.758. Also, it was found that croanbach alpha value of total scale (USIT) is 0.949. According to these results, it can be said that attitude scale regarding using instructional technology is a valuable and reliable scale.

DISCUSSIONS AND CONCLUSIONS

Rapid changes in technology have affected teaching-learning process. Also technology is the main support for the students learning developments nowadays. The aim of improving educational quality need to extent using technology aids this learning process. It is known that traditional approach not use to technology in the lessons is not always successful and efficient (Milliken and Barnes, 2002). With shifting from the teacher-centered instruction to child-centered instruction, the role, activities, attitudes, reflections of the students become more important concern to overlook the effectiveness of technology in instruction. Recent studies in the area indicate that effective use of education technology can help education system work better and more effectively (Jonassen and Reeves, 1996). Furthermore, Halderman (1992) expressed that majority of teachers demand using technology better in order to use of technology in the classes gives students the chance of learning faster and more permanent. Besides Tsou, Wang and Li (2002) dictated that instructional technology have positive effect of technology for realizing effective learning. So, teachers should know how to plan, design environment supported by technology and apply; how to use different strategies supported by the technology and how to follow the technological changes and improve them. Furthermore because of the fact that pre-service teachers will be in-service teachers in future, their' knowledge on using technology are very important. Therefore it is needed to have scale has been tested to pre-service teachers' attitude regarding using instructional technological. In the literature, there are so many attitude scales towards computer, technology, educational technology. But there are not enough attitude scales towards using instructional technology.

In this study, the using instructional technology scale was developed through the use of five stage model proposed. Subsequent to a review of literature and carried out interview with pre-service teachers, composed

item pool, validated the item pool across the experts and then initial draft of the instrument was constructed. Later, this initial draft was reviewed by the experts, USIT was administered to 1235 pre-service teachers in different University to the factorial structure of the scale, provide validity and further reliability evidences. Lastly validity and reliability of the attitude scale were calculated. These factors such as believe regarding usage of instructional technology in lesson (10 items), appreciation to usage of instructional technology in lesson (9 items) unappreciated using instructional technology (9 items), disinclination to make use of instructional technology (7 items), and believe in usefulness of instructional technology (2 items),

Factor analysis with principle component methods and item analysis result revealed seven factors behind USIT which explain 51.759% of the total variance together and USIT are appropriate to measure pre-service teachers' attitudes towards using instructional technology. In addition to croanbach alpha correlation, coefficients of five factors were calculated using Cronbach's alpha reliability of the factors and ranged from 0.758 to 0.92, indicating acceptable reliability range (Kline 1994, Fraser 1989). The overall scale reliability was calculated as 0.949.

According to the results, it must be emphasized that the USIT, which allows researchers to study pre-service teachers' attitudes' towards using instructional technology, was developed. Many of the research conducted in the literature are limited to participants from a single university, but there are seven universities in Turkey. So, participation from different universities was provided to eliminate errors related to scale. So, the attitudes scale comprehensive for pre-service teachers. The attitude scale that was developed in this study will fill the gap in the literature related to determining attitudes towards using instructional technologies. Followed by the additional validation studies; the USIT will serve as a valuable tool for both instructors and researchers to assess students' attitudes towards using instructional technology.

REFERENCES

Akbaba Altun, S., (2001) *Elementary School Principals' Attitudes towards Technology and Their Computer Experiments,* The World Congress on Computational Intelligence (WCCI) Triennial World Conference,10th, Madrid, Spain, September 10-15, 2001, 16p.

Akkoyunlu, B. (1996) Öğrencilerin bilgisayara karşı tutumları. *Eğitim ve Bilim*. 20(1), 15-29

Akkoyunlu, B., Orhan, F. &Umay, A. (2005) A Study on Developing Teacher Self Efficacy Scale For Computer Teachers, *H.U. Journal of Education,*29: 1-8.

Akpınar, E., Aktamış, H. & Ergin, Ö. (2005) Fen Bilgisi Dersinde Eğitim Teknolojisi Kullanılmasına İlişkin Öğrenci Görüşleri, *The Turkish Online Journal of Educational Technology – TOJET, 4, 1, Article 12*

Alkan, C. (1998). *Eğitim Teknolojisi (Genişletilmiş Beşinci Baskı):* Anı Yayıncılık, Ankara.

Akbulut, Y., Sahin, Y.L., & Eristi, B. (2010) Development of a scale to investigate cybervictimization among online social utility members. *Contemporary Educational Technology,* 1 (1), 46-59.

Başaran, İ. E. (1994) *Eğitime Giriş.* Kadıoğlu Matbaası, Ankara.

Beşoluk, Ş., Kurbanoğlu, N. İ. & Önder, İ. (2010) Educational technology usage of pre-service and in-service science and technology teachers, *Elementary Education Online*, 9(1), 389–395

Büyüköztürk, Ş. (2003*) Sosyal bilimler için veri analizi el kitabı: İstatistik, araştırma deseni, SPSS uygulamları ve yorum* (Geliştirilmiş 3.Baskı). Ankara: Pegema Yayınları.

Can, S. (2010). Attitudes of pre-service teachers from the department of elementary education towards the effects of materials use on learning, *The Turkish Online Journal of Educational Technology (TOJET)*, 9(2), 46-54.

Çakıroğlu, Ü., Güven, B. & Akkan, Y. (2008). Examining Mathematics Teachers' Beliefs About Using Computers in Mathematics Teaching, *Hacettepe University Journal of Education*, 35: 38-52.

Demirel, Ö. (2005). *Planlamadan Değerlendirmeye Öğretme Sanatı*. Pegem A Yayıncılık., Ankara.

Dunteman, G. H. (1989). *Principal component analysis, Quantitative applications in the social sciences series* (vol. 69). housand Oaks, CA: Sage.

Field, A. (2000). *Discovering statistics using SPSS for windows*, London: Sage Publications.

Flowers, C. P. & Algozzine, R. F. (2000) Development and Validation of Scores on the Basic Technology Competencies for Educators Inventory, *Educational and Psychological Measurement*, 60(3), 411-418.

Fraenkel J. R. & Wallen NE (1996) *How to Design and Evaluate Research in Education*, New York: McGraw-Hill.

Francis, J. (1993) Measuring attitude toward computers among undergraduate college students: The affective domain. *Computers and Education,* 20(3), 251-55

Frantom, C. G., Green, K. E. & Hoffman, E. R. (2002) Measure Development: The Children's Attitudes Toward Technology Scale (CATS). *Journal of Educational Computing Research*, *26*, 3, 249-263.

Fraser B. J. (1989). *Assessing and improving classroom environment*, Curtin University, Perth

Friedman, A., Bolick, C., Berson, M. & Porfeli, E. (2009) National educational technology standards and technology beliefs and practice of social studies faculty: Results from a seven year longitudinal study, *Contemporary Issues inTechnology and Teacher Education*, 9(4), 476-487.
George D. & Mallery, P (2001) *SPSS for Windows: Step by Step.* Allyn & Bacon, USA.
Griswold, P. A. (1983). Some determinants of computer awareness among education majors, *Association for Educational Data Systems Journal*, 16(2), 92-103
Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W.C., (1998) *Multivariate data analysis* (5th edition), New Jersey, Prentice Hall.
Halderman, C. F. (1992) *Design and evaluation of staff development program for technology in schools*. Dissertation Abstracts International, 53(12A), 4186
Hutcheson, G., & Sofroniou, N. (1999) *The multivariate social scientist*. London: Sage.
ISTE (2004) The National Educational Technology Standards. *http://cnets.iste.org/teachers/t_stands.html*
Jonassen, D., & Reeves, T. (1996) *Learning with technology: Using computers as cognitive tools*, In D. H. Jonassen (Ed.), Handbook of research on educational communications and technology (pp. 693-719), New York: Macmillan.
Jones, T., & Clarke, V. A. (1994) A computer attitude scale for secondary students. *Computers Education*, 22(4), 315–318
Kay, R. H. (1993). An exploration of theoretical and practical foundations for assessing attitudes toward computers: The computer attitude measure (CAM). *Computers in Human Behavior*, 9, 371-386.
Kline, P. (1994) *An Easy Guide to Factor Analysis*, London: Routledge
Knezek, G., & Miyashita, K. (1993) *Handbook for the Young Children's Computer Inventory,* Denton, TX: Texas Center for Educational Technology.
Koşar, E., Yüksel S., Özkılıç, R., Avcı, U., Alyaz, Y. & Çiğdem, H. (2003) *Öğretim teknolojileri ve materyal geliştirme*, (2. Baskı), Ankara: Pegem A Yayınları
Metin, M. (2010) A Study on Developing a General Attitude Scale about Environmental Issue for Students in Different Grade Level, *Asia-Pacific Forum on Science Learning and Teaching*, 11, (2), 3
Metin, M. & Özmen, H. (2008) *Performans Değerlendirmeye Yönelik Tutum Ölçeği Geliştirilmesi,* VIII. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi, Abant İzzet Baysal Üniversitesinde, Bolu
Milleken, J., & Barnes, L. P. (2002) Teaching and technology in higher education: student perceptions and personal reflections, *Computers & Education,* 39 (3), 223-235
Öksüz, C., Ak, Ş. & Uça, S. (2009). A Perceptions Scale for Technology Use in the Teaching of Elementary Mathematics, *Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi*, VI,(1), 270-287.
Ozgen K. & Obay,M.(2008). *Ortaöğretim Matematik Öğretmen Adaylarının Eğitim Teknolojisine İlişkin Tutumlar,* IETC 2008, Anadolu University Faculty of Education Department of Computer Education & Instructional Technologies Eskişehir.
Page, R. L. and oth. (1979) Attitude Assessment in Science and Technology, *CORE,* vol. 3, no. 3, p9.
Pala, A. (2006). İlköğretim Birinci Kademe Öğretmenlerin Eğitim Teknolojilerine Yönelik Tutumları, *Sosyal Bilimler Dergisi,* Sayı: 16, 177-188.
Pallant, J. (2001). *SPSS survival manual*, Maidenhead, PA: Open University Press.
Raub, A. C. (1981). Correlates of computer anxiety in college students, unpublished doctoral dissertation, University of Pennsylvania, Philadelphia
Rose, D. & Meyer, A. (2000) The Future is in the Margins: The Role of Technology and Disability in Educational Reform
http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/16/ee/6d.pdf
Sarıtaş, M. (2007), Öğretim Teknolojileri ve Materyal Tasarımı, Pegem-A Yayıncılık, Ankara
Selwyn, N. (1997). Students' Attitudes toward Computers: Validation of a Computer Attitude Scale for 16-19 Education. *Computers Education,* 28, (1), 35-41
Spinner H, & Fraser B. J, (2005) Evaluation of an innovative mathematics program in terms of classroom environment, student attitudes, and conceptual development, *International Journal of Science and Mathematics Education, 3*, 267–293
Tabachnick, B., & Fidell, L. (2007) *Using multivariate statistics,* Boston: Allyn & Bacon.
Tsou, W., Wang, W., & Li, H. L. (2002) How computers facilitate English foreign language learners acquire English abstract words. *Computers & Education,* 39 (4), 415-428.
Varış, F. (1991).*Eğitim Bilimine Giriş*. Ankara: Ankara Üniversitesi
Yalın, H. İ. (2004). *Öğretim Teknolojileri ve Materyal Geliştirme*, Nobel Yayın Dağıtım, Ankara.
Yavuz, S. & Coskun A. E. (2008). Sınıf öğretmenliği öğrencilerinin eğitimde teknoloji kullanımına ilişkin tutum ve düşünceleri, *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 34, 276-286.
Yılmaz, M. (2005). *İlköğretim 7. sınıflarda simetri konusunun öğretiminde eğitim teknolojilerinin başarı ve tutuma etkisi*. Marmara Üniversitesi Eğitim Bilimleri Enstitüsü, Yayımlanmamış Yüksek Lisans Tezi,İstanbul.

