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TECHNOLOGY USAGE COMPETENCIES OF TEACHERS: PRIOR TO FATIH PROJECT IMPLEMENTATION

ÖĞRETMENLERİN TEKNOLOJİ KULLANIM YETERLİKLERİ: FATİH PROJESİ UYGULAMA ÖNCESİ[1]

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Abstract

The aim of this study is to specify the technology usage competency levels of high school teachers according to educational technology standards. The target population of the study consisted of 224 teachers working in high schools applied in the Fatih project in the centre and districts in the frame of the Eskişehir Directorate of National Education in 2011-2012 academic years. Descriptive survey model and relational survey model were used in research. The study was conducted through sampling out of target population and convenience sampling method was used in sampling. The assessment instrument used in this research was developed by the researchers grounding on the dimensions of National Educational Technology Standards for Teachers (NETS*T). The data have been described through frequency, percentage, arithmetic mean, standard deviation values, independent examples t-test and one-way variance analyses. According to the data procured at the end of the research, they thought that teachers meet the NETS*T standards and have a good level of technology usage skills.. however, the level of their ability to use smart board and developing learning object is low. It is concluded that teachers' technology usage competency levels do not show significant difference according to their gender, branch, their educational level and their seniority.

Key Words: Technology Literacy, Fatih Project, Quantitative research, Educational Administration.

Öz

Bu çalışmanın amacı, lise öğretmenlerinin eğitim teknolojisi standartlarına göre teknoloji kullanım yeterlik düzeylerini belirlemektir. Araştırmanın evrenini 2011–2012 eğitim-öğretim yılında Eskişehir Milli Eğitim Müdürlüğü'ne bağlı merkez ve ilçelerde bulunan ve Fatih projesi uygulanan liselerde görev yapan 224 öğretmen oluşturmaktadır. Bu araştırmada betimsel tarama ve ilişkisel tarama modeli kullanılmıştır. Araştırma, evrenden örneklem seçme yoluyla yürütülmüş, örnekleminin seçiminde ise kolayda örnekleme yöntemi kullanılmıştır. Araştırmada kullanılan ölçme aracı, Öğretmen Ulusal Eğitim Teknoloji Standartları (NETS*T) boyutları temel alınarak araştırmacılar tarafından geliştirilmiştir. Veriler, frekans, yüzde, aritmetik ortalama, standart sapma değerleri ile bağımsız örnekler t- testi ve tek yönlü varyans analizi çözümlemeleriyle betimlenmiştir. Araştırma sonucunda elde edilen verilere göre, öğretmenlerin NETS*T standartlarını karşıladıkları ve iyi düzeyde teknoloji kullanım becerilerine sahip olduklarını düşünmektedirler. Ancak akıllı tahta kullanımı ve öğrenme nesnesi geliştirme düzeyleri düşüktür. Öğretmenlerin teknoloji kullanım yeterlik düzeylerinin öğretmenlerin cinsiyetlerine, branşlarına, eğitim durumlarına ve kıdemlerine göre anlamlı bir farklılık göstermediği sonucuna ulaşılmıştır.

Anahtar Kelimeler: Teknoloji okuryazarlığı, Fatih projesi, Nicel araştırma, Eğitim yönetimi.

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Introduction

Science, technology and environmental changes force both people and society to change and innovate. In this process, the educational institutions having to meet the increasing needs of modern societies should have a more flexible and innovative structured compared to the past. (Çuhadar, Bülbül and Ilgaz, 2013). Of course the teachers, the implementers of educational policies, have a great importance and role in order for educational institutions to have a flexible and innovative structure. Vanderline and Braak (2011) state that teachers have an important role for educational innovations to be implemented.

In Turkey, supplying a big infrastructure like Fatih project in technology usage in educational policies, in the schools which Fatih project will be implemented in, teachers will be needed who can use the technological facilities together with pedagogical approaches and who are innovative and can accommodate themselves to innovations. Therefore, before the implementation of Fatih project, it seems essential to specify the competencies of those teachers –working in high schools which Fatih project will be implemented in– related to usage of information and communication technologies in learning-teaching processes and to improve their skills through in-service training courses, if needed. In this context, the aim of this study is to specify the technology usage competency levels of high school teachers according to educational technology standards and analyse the specified competency levels in terms of various variables (gender, branch, occupational experience, educational level, technology usage frequency, technology usage time).

In the specification of teachers' technology usage competencies, the standards which were developed within the context of NETS and which teachers must have with respect to educational technology usage (NETS*T) have been used in this research and an assessment instrument has been developed by the researchers within the frame of these standards.

Main objective of the NETS project is to improve the learning outcomes throughout the U.S.A by means of developing national standards for usage of technology in education in all grades from kindergarten to 12th grade (K-12) (NETS, 2007), to specify the technology assisted learning activities in accordance with the curricula, and to evaluate the students' technology usage (Bitter and Pierson, 1999). Teachers can use the standards developed within the scope of NETS project in the planning process of technology-enriched activities in order to facilitate students' learning and improve their technology usage skills (Bitter and Pierson, 1999; Franklin, 1999; Irving and Bell, 2004). Within the context of NETS project, the

standards students (NETS*S), teachers (NETS*T) and education administrators (NETS*A) must have with respect to educational technology usage have been specified and all of these standards have been gathered under the same roof of NETS (Çoklar, 2008: NETS, 2007). NETS project was first implemented in the U.S.A. and the implementations were observed. In the U.S.A. 49 of 51 states adopted, implemented or adapted for themselves at least one of the educational technology standards for students, teachers and education administrators (Çoklar, 2008).

National Educational Technologies Standards for Teachers (NETS*T)

It is seen that NETS*T standards, the competencies teachers must have, come under six dimensions (NETS, 2007). These six dimensions have been tried to be explained shortly below.

Technological Concepts and Operations: In this dimension, teachers are expected to use technology and renovate themselves against fast developing technology.

Planning and Designing Learning Environments and Experiences: Teachers are expected to organize learning environments by means of using technology in accordance with the students' development levels and in a way that will provide individual learning.

Teaching, Learning and Educational Program: Teachers are expected to know and implement appropriate methods and techniques in order to increase students' learning levels by means of letting them question information, bringing out their high-level thinking and creativity skills, taking into account individual differences and offering them an opportunity to experience.

Assessment and Evaluation: Teachers are expected to implement different assessment techniques, make analyses and interpretations in accordance with the data procured in order to make the learning process more effective by means of taking the advantage of technology.

Efficiency and Occupational Implementation: Teachers, in order to give more efficient education, are expected to sustain their professional development via technology in all subjects of professional knowledge and content knowledge and be lifelong learners.

Social, Ethical, Legal and Human Issues: Teachers are expected to give an education that will lead them to ethical conscience while using technology, offer them an opportunity to make use of technology equally and inform their students about how they can be secure about technology use and how healthy use is.

The aim of this study is to specify the technology usage competency levels of high school teachers according to educational technology standards and analyse the specified competency levels in terms of various variables (gender, branch, occupational experience, educational level, technology usage frequency, technology usage time).

Method

Research Model

In this research quantitative research method was used. This study aiming to specify the general status of teachers in terms of educational technology standards skills has been figured through descriptive survey model and relational survey model.

Population and Sample

The target population of the study is consisted of teachers working in the high schools applied in the Fatih project in the centre and districts dependent on Eskişehir Directorate of National Education in 2011-2012 academic years. The study has been conducted through sampling out of target population and convenience sampling method has been used in sampling.

Developing the data collection tool

Within the framework of techno pedagogical competencies expected from teachers in the scope of Fatih Project, the assessment instrument used in this research has been developed by the researchers grounding on the dimensions of NETS*T (National Educational Technology Standards for Teachers) defining the knowledge and skills which the teachers need in order to plan technology based activities in their schools and which students need so as to make good use of educational technologies effectively.

Data Analysis

The data obtained from the teachers having participated in the research voluntarily during the dates of the implementation have been described through frequency, percentage, arithmetic mean, standard deviation values, independent examples t-test and one-way variance analyses.

FINDINGS

The frequency distributions, totals, percentages and arithmetic means procured from the survey items are given in the Table 1 below. The formula “1/5=0,8” is used in order to specify

a standard view range for each item. Then these view ranges are determined as follows: the arithmetic mean for any survey item is ($\overline{X}_i$); if the arithmetic mean of the *item i* $\overline{X}_i$ is between $1 \leq \overline{X}_i < 1{,}8$ it means the participants "Strongly Disagree" with the relevant item for Table 4 and it is stated as "Never" for Table 1 and Table 2; if it is between $1{,}8 \leq \overline{X}_i < 2{,}6$ it means the participants "Disagree" with the relevant item for Table 4 and it is stated as "Rarely" for Table 2 and Table 3; if it is between $2{,}6 \leq \overline{X}_i < 3{,}4$ it means the participants "Partly Agree" with the relevant item for Table 4 and it is stated as "Sometimes" for Table 2 and Table 3; if it is between $3{,}4 \leq \overline{X}_i < 4{,}2$ it means the participants "Agree" with the relevant item for Table 4 and it is stated as "Often" for Table 2 and Table 3; if it is between $4{,}2 \leq \overline{X}_i < 5{,}00$ it means the participants "Strongly Agree" with the item for Table 4 and it is stated as "Always" for Table 2 and Table 3.

Tablo 1. Participants' Demographic Information

		Frequency	**Percentage (%)**
Gender	Male	72	32,1
	Female	152	67,9
	Total*	**224**	**100,0**
Branch	Physical Education	9	4,0
	Information Technologies	6	2,7
	Biology	18	8,0
	Geography	20	8,9
	Philosophy	1	0,4
	Physics	18	8,0
	English	18	8,0
	Chemistry	18	8,0
	Mathematics	28	12,5
	Music	5	2,2
	Guidance	4	1,8
	Art – Visual Arts	6	2,7
	History	22	9,8
	Turkish-Turkish Language and Literature	30	13,4
	Religion and Moral	14	6,3
	Technology and Design	7	3,1
	Total*	**224**	**100,0**
Educational Level	Associate Degree	11	4,9
	Undergraduate Degree	184	82,1
	Master Degree	28	12,5
	Doctorate Degree	1	0,4
	Total*	**224**	**100,0**
Seniority	1-5 years	3	10,3
	6-10 years	50	22,3
	11-15 years	71	31,7
	16-20 years	45	20,1
	21 years and more	35	15,6
	Total*	**224**	**100,0**

(*)There are not any unanswered data

Within the framework of techno pedagogical competencies expected from teachers in the scope of Fatih Project, the assessment instrument used in this research has been developed by the researchers grounding on the dimensions of NETS*T (National Educational Technology Standards for Teachers) defining the knowledge and skills which the teachers need in order to plan technology based activities in their schools and which students need so as to make good use of educational technologies effectively.

Table 2. The Frequencies of Teachers' Software and Hardware Usage

The Frequencies of Software and Hardware Usage (N=224)	Never		Rarely		Sometimes		Often		Always		Unanswered		$\overline{X}$
	F	%	F	%	F	%	F	%	F	%	F	%	
Computer (Desktop, Laptop, Netbook)	125	55,8	73	32,6	24	10,7	1	0,4	1	0,4	0	0	4,43
Tablet PC	22	9,8	31	13,8	18	8,0	22	9,8	131	58,5	0	0	2,07
Projection	56	25,0	84	37,5	50	22,3	22	9,8	12	5,4	0	0	3,67
Printer	86	38,4	81	36,2	42	18,8	9	4,0	6	2,6	0	0	3.96
Scanner	32	14,3	42	18,8	67	29,9	36	16,1	47	21,0	0	0	2,90
Smartboard	19	8,5	24	10,7	43	19,2	31	13,8	107	47,8	0	0	2,19
Educational Websites (Eba, Morpa, Vitamin etc.)	61	27,2	64	28,6	45	20,1	31	13,8	23	10,3	0	0	3,49
Forum Pages / Social Networks	80	35,7	58	25,9	41	18,3	27	12,1	18	8,0	0	0	3,70
Educational Videos	61	27,2	84	37,5	55	24,6	18	8,0	6	2,7	0	0	3,79
Learning Objects	53	23,7	93	41,5	49	21,9	18	8,0	11	4,9	0	0	3,71
Word Processor (Word etc.)	102	45,5	65	29,0	34	15,2	14	6,3	9	4,0	0	0	4,06
Electronic Table (Excel etc.)	66	29,5	47	21,0	63	28,1	28	12,5	20	8,9	0	0	3,50
Presentation (PowerPoint etc.)	68	30,4	69	30,8	52	23,2	20	8,9	15	6,7	0	0	3,70
Graphics Programs (Photoshop etc.)	28	12,5	24	10,7	56	25,0	49	21,9	67	29,9	0	0	2,55
Animation Programs (Flash etc.)	20	8,9	27	2,1	63	28,1	66	29,5	48	21,4	0	0	2,58
Web Page Programs (Dreamweaver etc.)	20	8,9	12	5,4	45	20,1	61	27,2	86	38,4	0	0	2,20

When Table 2 is analysed, it is seen that teachers "rarely" use smart boards and tablet PCs which are the tools of Fatih project. This finding can be because of the hypothesis that teachers did not join the 32-hour in-service training course "Use of Technology in Education" in the research period and thus they did not want to use the tools of Fatih project or they weren't allowed to use them. It is also seen that teachers prefer to use the readymade learning objects on the educational web pages such as Eba, Morpa and Vitamin, and that they do not use the programs via which they can create their own learning objects for their lessons. This finding shows that teachers prefer to use readymade learning objects.

Table 3. The Aims of Teachers' Technology Usage

Technology Usage Aims (N=224)	Never		Rarely		Sometimes		Often		Always		Unanswered		$\overline{X}$
	F	%	F	%	F	%	F	%	F	%	F	%	
Presentation of information	95	42,4	72	32,1	48	21,4	7	3,1	2	0,9	0	0	4,13
Arranging the learning environment in accordance with the individual differences	54	24,1	91	40,6	57	25,4	18	8,0	4	1,8	0	0	3,78
Arranging the learning environment in accordance with different learning strategies	58	25,9	88	39,3	56	25,0	16	7,1	6	2,7	0	0	3,79
Consolidation of the learnt items	86	38,4	94	42,0	32	14,3	10	4,5	2	0,9	0	0	4,13
Associating the learnt items to daily life more easily	79	35,3	86	38,4	48	21,4	10	4,5	1	0,4	0	0	4,04
Student learning through games	62	27,7	74	33,0	63	28,1	19	8,5	6	2,7	0	0	3,75
Canalizing students to do research	68	30,4	95	42,4	41	18,3	18	8,0	2	0,9	0	0	3,94
Developing students' problem solving skills	58	25,9	105	46,9	48	21,4	10	4,5	3	1,3	0	0	3,92
Attracting students' attention to the lesson	100	44,6	90	40,2	23	10,3	9	4,0	2	0,9	0	0	4,24
Increasing students' motivation	93	41,5	93	41,5	27	12,1	9	4,0	2	0,9	0	0	4,19

When Table 3 is analysed, it is seen that teachers often use technology in order to present information, arrange the learning environment in accordance with the individual differences and different learning strategies, enable students to consolidate the learnt items, associate the learnt items to daily life more easily, enable students to learn through games, canalize students to do research, develop students' problem solving skills, attract students' attention to the lesson and increase students' motivation.

Table 4. Teachers' Views on Technology Usage Skills

Teachers' views on Fatih project (N=224)	Strongly Disagree		Disagree		Partly Agree		Agree		Strongly Agree		Unanswered		$\overline{X}$
	F	%	F	%	F	%	F	%	F	%	F	%	
1. I easily learn how to use a new technological device and a computer program.	11	4,9	26	11,6	27	12,1	94	42,0	66	29,5	0	0	3,79
2. I explain the logic of operation and functioning of a programme and software.	5	2,2	42	18,8	74	33,0	76	33,9	27	12,1	0	0	3,34
3. I explain the advantages and constraints of technology, positive and negative sides of its use in daily life.	6	2,7	24	10,7	42	18,8	112	50,0	40	17,9	0	0	3,69
4. I enable my students to make good use of information technologies (computers, internet ...) in order to produce technology-based creative products, projects and new ideas and develop new methods to solve the problems they encounter.	7	3,1	22	9,8	27	12,1	127	56,7	41	18,3	0	0	3,77

5.	I guide my students when they use suitable programs (MS Word, Excel, PowerPoint) in order to develop technology based products when preparing their project and performance works.	9	4,0	32	14,3	40	17,9	110	49,1	33	14,7	0	0	3,56
6.	I use suitable sources and programmes (e-book, e-magazine, educational software, learning object ...) in order to support my students' learning.	7	3,1	28	12,5	37	16,5	104	46,4	48	21,4	0	0	3,70
7.	I use information technologies in order to carry out any kind of correspondence, my private affairs and operations.	11	4,9	19	8,5	26	11,6	111	49,6	57	25,4	0	0	3,82
8.	I solve hardware problems to be encountered in the class.	25	11,2	45	20,1	70	31,3	61	27,2	23	10,3	0	0	3,05
9.	I solve software problems to be encountered in the class.	28	12,5	49	21,9	74	33,0	52	23,2	21	9,4	0	0	2,95
10.	I install software I need for the activities to be used in the lesson.	21	9,4	52	23,2	50	22,3	72	32,1	29	12,9	0	0	3,16
11.	I choose and use the most suitable technological device for my students and the activities I will use in my lesson.	8	3,6	18	8,0	48	21,4	112	50,0	38	17,0	0	0	3,68
12.	I make arrangements in the classroom so that all of the students in the class can make good use of information technologies equally.	8	3,6	23	10,3	43	19,2	113	50,4	37	16,5	0	0	3,66
13.	I make arrangements for technology use to insure interstudent cooperation.	7	3,1	23	10,3	53	23,7	109	48,7	32	14,3	0	0	3,60
14.	I prepare audio-visual and learning-by-doing environments via information technologies for the students having different learning strategies.	6	2,7	26	11,6	44	19,6	104	46,4	4	19,6	0	0	3,68
15.	I evaluate whether or not the technological devices and software for the activities to be used in the lesson are suitable for my students' use.	9	4,0	20	8,9	38	17,0	112	50,0	45	20,1	0	0	3,73
16.	I conduct different activities for my students so that they can evaluate the accuracy and reliability of the information they obtained through information technologies.	8	3,6	21	9,4	54	24,1	109	48,7	32	14,3	0	0	3,60
17.	I conduct different activities for my students so that they can use the information they obtained through information technologies in accordance with the ethical and legal usage rights.	13	5,8	16	7,1	49	21,9	113	50,4	33	14,7	0	0	3,61
18.	I provide activities based on the use of information technologies for my students so that they can produce creative products and projects.	8	3,6	29	12,9	47	21,0	106	47,3	34	15,2	0	0	3,57
19.	I prepare learning objects suitable for my students' learning levels and learning strategies.	8	3,6	30	13,4	39	17,4	110	49,1	37	16,5	0	0	3,61
20.	I choose and use the learning objects suitable for my students' learning levels and learning strategies.	8	3,6	21	9,4	43	19,2	112	50,0	40	17,9	0	0	3,69
21.	I provide activities including the use of technology so that my students can develop their skills of problem solving, critical thinking, building up information and creativity.	7	3,1	21	9,4	43	19,2	113	50,4	40	17,9	0	0	3,70
22.	I make good use of information technologies for assessment and evaluation (writing questions, making a scoring table, entering marks on e-school etc.).	6	2,7	10	4,5	22	9,8	95	42,4	91	40,6	0	0	4,13
23.	I make good use of information technologies in order to inform students and parents about the evaluation results of the activities and the lesson.	8	3,6	18	8,0	32	14,3	106	47,3	60	26,8	0	0	3,85
24.	I improve myself perpetually about new technological means.	6	2,7	23	10,3	53	23,7	98	43,8	44	19,6	0	0	3,67
25.	I exchange information and ideas with experts and my colleagues online (forum and discussion sites, means of communication such as e-mail, content management systems) for my professional development.	8	3,6	31	13,8	45	20,1	99	44,2	41	18,3	0	0	3,59

26.	I utilise the means of communication such as e-mail, forum and discussion sites in order to be in cooperation with my students, their parents and my colleagues.	8	3,6	27	12,1	53	23,7	100	44,6	36	16,1	0	0	3,57
27.	I can teach the ethical issues (copyright, privacy, accuracy...) needed for the use of technology and that of information obtained through technology.	6	2,7	36	16,1	54	24,1	98	43,8	30	13,4	0	0	3,49
28.	I teach my students the punishments and sanctions of using information technologies illegally and non-ethically.	7	3,1	30	13,4	48	21,4	104	46,4	35	15,6	0	0	3,58
29.	I discuss the individual responsibilities with my students related to the results of using technology and information obtained through technology unsuitably.	8	3,6	26	11,6	43	11,6	105	46,9	42	18,8	0	0	3,65
30.	I use appropriate technological means to monitor my students' learning progress.	7	3,1	15	6,7	51	22,8	110	49,1	41	18,3	0	0	3,72
31.	I can teach my students the ergonomic use of information technologies and their negative effects on health.	7	3,1	20	8,9	40	17,9	112	50,0	45	20,1	0	0	3,75
32.	I can make and implement plans including the security measures during technology use in the class.	7	3,1	26	11,6	53	23,7	100	44,6	38	17,0	0	0	3,60
33.	I conduct a series of informative activities for my students about the security measures to be taken and ways of avoiding dangers to be exposed while doing a research on the internet or their private operations.	8	3,6	28	12,5	51	22,8	101	45,1	36	16,1	0	0	3,57

When Table 4 is analysed, it is seen that teachers need help and guidance for the technical issues such as understanding the operation and functioning of software, installing the software needed for the activities to be used in the lesson and possible hardware and software problems. It is also seen that the participant teachers totally agree with the advantages of the use of Fatih project in teaching-learning process for students and teachers, and believe they have technology usage competency –at a level that they can make good use of these advantages of technology– in technological concepts and operations, planning and designing learning environments and experiences, teaching, learning and educational program, assessment and evaluation, efficiency and professional practice, social, ethical, legal and human issues that are all included in National Educational Technologies Usage Standards for Teachers (NETS*T). According to the results obtained from the findings of the research, it is seen that teachers expressed positive opinions about technology usage competencies without a significant difference according to gender, seniority and branch.

It is analysed whether or not there is a significant difference between the points teachers gave with respect to technology usage competencies and their genders, the findings are presented in Table 5.

Table 5. The Results of the T-Test Carried out Depending upon Gender Variable.

Gender	N	$\overline{X}$	S	Sd	t	P
Female	152	3,63	0,64	222	0,527	0,59
Male	72	3,57	0,93			

As it can be seen in Table 5, teachers' viewpoints about technology usage competencies do not show a significant difference according to gender since it is P>0,05. In other words, the viewpoints of male and female teachers about technology usage competencies are not different. Both female and male teachers express positive opinions about technology usage competencies.

It is analysed whether or not there is a significant difference between the points teachers gave with respect to technology usage competencies and their branches, the findings are presented in Table 6 and Table 7.

Table 6. Frequency Distribution According to Teachers' Branches and Points, Averages and Standard Deviations of Their Viewpoints with Respect to Technology Usage Competencies

Branch	N	$\overline{X}$	Standard Deviation	Standard Error
Physical Education	9	3,68	0,56	0,18
Information Technologies	6	4,12	0,44	0,17
Biology	18	3,59	0,89	0,21
Geography	20	3,43	0,71	0,16
Philosophy	1	5,00		
Physics	18	3,63	0,50	0,12
English	18	3,67	0,64	0,15
Chemistry	18	3,55	0,78	0,18
Mathematics	28	3,76	0,84	0,16
Music	5	3,53	0,32	0,14
Guidance	4	3,45	0,37	0,18
Art – Visual Arts	6	2,95	0,56	0,23
History	22	3,49	1,05	0,22
Turkish-Turkish Language and Literature	30	3,72	0,64	0,11
Religion and Moral	14	3,40	0,78	0,20
Technology and Design	7	3,82	0,60	0,23
TOTAL	**224**	3,61	0,79	0,05

The results of one-way variance analysis carried out according to the data in Table 6 are seen in Table 7 below.

Table 7. The Results of F-Test carried out Depending upon Branch

Source of Variance	Sum of Squares	Sd	Average of Squares	F	P (p<0.05)
Between-groups	9,254	15	0,617	1,106	0,352
Within-groups	115,989	208	0,558		
Total	125,243	223			

When Table 6 and Table 7 are analysed, the value $F_{[15-208]}$=1.106 calculated as a result of the analyses is not found significant at P<.05 level. Therefore, PostHoc test has not been carried out. According to this result, teachers' viewpoints about technology usage competencies do not show a significant difference according to their branches. When the differences in teachers' branches are taken into consideration, teachers report positive opinions about technology usage competencies.

It is analysed whether or not there is a significant difference between the points teachers gave with respect to technology usage competencies and their educational levels, the findings are presented in Table 8 and Table 9.

Table 8. Frequency Distribution According to Teachers' Educational Levels and Points, Averages and Standard Deviations of Their Viewpoints with Respect to Technology Usage Competencies

Educational Level	**N**	$\overline{X}$	**Standard Deviation**	**Standard Error**
A- Associate Degree	11	3,18	0,91	0,27
B- Undergraduate Degree	184	3,63	0,72	0,53
C- Master Degree	28	3,62	0,81	0,15
D- Doctorate Degree	1	3,78		
TOTAL	224	3,61	0,74	0,05

The results of one-way variance analysis carried out according to the data in Table 8 can be seen in Table 9.

Table 9. The Results of F-Test carried out depending upon Educational Level

Source of Variance	**Sum of Squares**	**Sd**	**Average of Squares**	**F**	**P (p<0.05)**
Between-groups	2,165	3	0,722	1,290	0,279
Within-groups	123,078	220	0,559		
Total	125,243	223			

When Table 8 and Table 9 are analysed, the value $F_{[3-220]}$=1.290 calculated as a result of the analyses is not found significant at P<.05 level. Therefore, PostHoc test has not been carried out. According to this result, teachers' viewpoints about technology usage competencies do not show a significant difference according to their educational levels. When the differences in teachers' educational levels are taken into consideration, teachers report positive opinions about technology usage competencies.

One-way variance analysis has been applied in order to see whether or not there is a significant difference between teachers' professional seniority status and their viewpoints with respect to technology usage competencies. You can see in Table 10 the frequency

distribution according to teachers' length of service and the arithmetic means ($\overline{X}$) and standard deviations of the points obtained from their viewpoints with respect to technology usage competencies.

Table 10. Frequency Distribution According to Teachers' Length of Service and Points, Averages and Standard Deviations of Their Viewpoints with Respect to Technology Usage Competencies

Length of Service	N	$\overline{X}$	Standard Deviation	Standard Error
A-1-5 years	23	3,63	0,758	0,158
B-6-10 years	50	3,67	0,690	0,097
C-11-15 years	71	3,60	0,780	0,092
D-16-20 years	45	3,53	0,767	0,114
E-21 years and more	35	3,63	0,771	0,130
TOTAL	224	3,61	0,749	0,050

The results of one-way variance analysis carried out according to the data in Table 10 are seen in Table 11.

Table 11. The Results of F-Test Carried out depending upon Seniority Variable

Source of Variance	Sum of Squares	Sd	Average of Squares	F	P (p<0.05)
Between-groups	0,450	4	0,113	0,198	0,939
Within-groups	124,792	219	0,570		
Total	125,243	223			

When Table 10 and Table 11 are analysed, the value $F_{[4-219]}$=0.198 calculated as a result of the analyses is not found significant at P<.05 level. Therefore, PostHoc test has not been carried out. According to this result, teachers' viewpoints about technology usage competencies do not show a significant difference according to their professional seniority. When the teachers' seniority is taken into consideration, teachers report positive opinions about technology usage competencies.

RESULTS, DISCUSSION AND SUGGESTION

In this research we aimed to specify the technology usage competency levels of high school teachers according to educational technology standards and analyse the specified competency levels in terms of various variables (gender, branch, occupational experience, educational level, technology usage frequency, technology usage time).

According to the data procured at the end of the research, when the findings procured from 224 participant teachers are interpreted; it is observed that teachers meet the NETS*T standards and have a good level of technology usage skills. This finding shows parallelism with the results of the research conducted by Taş and others (2007). Taş and others (2007), at

the end of the study conclusion showed that teachers have positive viewpoints about technology use, technology use makes education interesting and teachers generally use word processor, electronic spreadsheet and presentation as computer programs.

According to the data procured at the end of the research, when the findings procured from 224 participant teachers are interpreted; it is seen that teachers "rarely" use smart boards and tablet PCs which are the tools of Fatih project. This finding can be because of the hypothesis that teachers did not join the 32-hour in-service training course "Use of Technology in Education" in the research period and thus they did not want to use the tools of Fatih project or they weren't allowed to use them. It is also seen that teachers prefer to use the readymade learning objects on the educational web pages such as Eba, Morpa and Vitamin, and that they do not use the programs via which they can create their own learning objects for their lessons. This finding shows that teachers prefer to use readymade learning objects.

This finding shows parallelism with the results of the pilot implementation conducted by ERI (2011) in Ankara a primary school and Antalya a primary school in order to minimize the problems to be encountered during the execution of Fatih project and in order for the project to be fulfilled effectively, efficiently and in time. According to the results of the pilot implementation carried out by ERI (2011), a great majority of the teachers express that they do not experience difficulty in using laptop computers and projection devices, however, it is concluded that they do not have much information about the use of smart boards. According to the results of the same research, a great majority of the teachers state that students cannot use the IT devices in the classrooms and their parents do not usually have information about the efficient use and benefits of these equipments.

The finding that teachers rarely use smart boards and tablet PCs that are the tools and equipments of Fatih project can be because of the hypothesis that teachers did not join the 32-hour in-service training course "Use of Technology in Education" in the research period and thus they did not want to use the tools of Fatih project or they weren't allowed to use them. This finding shows parallelism with the findings of the research carried out by ERI (2011). Yıldırım and Kete (2002). According to the results of the pilot implementation by ERI (2011) a considerable part of teachers do not have a sufficient background to use a projection device, computer, smart board and the internet. Teachers in need should immediately receive in-service training courses in order for Fatih project to process efficiently. At the end of the study Yaman (2007) it was concluded that teachers who received in-service training for

technology use technology in their lessons more often and more purposefully than those who did not receive in-service training.

According to the data procured at the end of the research, when the findings procured from 224 participant teachers are interpreted; it is also seen that teachers prefer to use the readymade learning objects on the educational web pages such as Eba, Morpa and Vitamin, and that they do not use the programs via which they can create their own learning objects for their lessons. This finding shows that teachers prefer to use readymade learning objects. These research findings show parallelism with those of the research conducted by ERI (2011), Yıldırım and Kete (2002).

Yıldırım and Kete (2002), at the end of the study he conducted, it was concluded that, in order to increase efficiency in teaching biology, it is crucial not only to enrich the tools and equipments of educational technology at schools by means of updating.

According to the results of the pilot implementation carried out by ERI (2011), more than half of the teachers express that the curriculum does not support the use of technological devices in classrooms and that of e-contents such as audios, animations, presentations, photos/images and interactive e-books when lecturing on a topic, and a great majority of the teachers state that they cannot reach a sufficient number of e-contents and they themselves cannot prepare e-contents.

According to the data procured at the end of the research, when the findings procured from 224 participant teachers are interpreted; it is seen that teachers often use technology in order to present information, arrange the learning environment in accordance with the individual differences and different learning strategies, enable students to consolidate the learnt items, associate the learnt items to daily life more easily, enable students to learn through games, canalize students to do research, develop students' problem solving skills, attract students' attention to the lesson and increase students' motivation.

These research findings show parallelism with those of the research conducted by ERI (2011). According to the results of the pilot implementation carried out by ERI (2011); after the interview with the students of, the students express their opinions as follows: "I learn better what I learn visually.", "Lessons became enjoyable.", It became easy for me to understand lessons.", "We solve questions practically and fast.", We became active in lessons.", We can prepare slides and give presentation by ourselves.". A large part of the students in Antalya

students express that the use of the IT devices increased their interest in the lessons, they learn better and more easily and lessons became more enjoyable.

According to the data procured at the end of the research, when the findings procured from 224 participant teachers are interpreted; it is seen that teachers need help and guidance for the technical issues such as understanding the operation and functioning of software, installing the software needed for the activities to be used in the lesson and possible hardware and software problems. It is also seen that the participant teachers totally agree with the advantages of the use of Fatih project in teaching-learning process for students and teachers, and believe they have technology usage competency –at a level that they can make good use of these advantages of technology– in technological concepts and operations, planning and designing learning environments and experiences, teaching, learning and educational program, assessment and evaluation, efficiency and professional practice, social, ethical, legal and human issues that are all included in National Educational Technologies Usage Standards for Teachers (NETS*T).

These findings show parallelism with those of the researches carried out by Demir and Bozkurt (2011) and Judson (2006). According to the results of the research by Demir and Bozkurt (2011), teachers beliefs related to importance of technology are the most important factor determining the teachers' technology usage frequency. According to Judson's (2006) 32 teachers' technology integration lesson video analyses, teachers supporting student centred education have a constructive approach in technology integration practices. Teachers believing that students can learn better by teacher centred education are less likely to support using technology for research purposes (Judson, 2006). Yıldırım and Kete (2002), at the end of the study he conducted to teach teachers how to use educational technology through in-service training.

According to the data procured at the end of the research, when the findings procured from 224 participant teachers are interpreted; it is seen that teachers expressed positive opinions about technology usage competencies without a significant difference according to gender, branch, levels of education and seniority.

This finding is different from the findings of the researches conducted by Beşoluk and others (2010), Yaman (2007) and Özçelik and Kurt (2007). At the end of the research Beşoluk and others (2010) results showed that teachers having fifteen or more years of experience have a lower average than others. At the end of the research Yaman (2007) results were; female

teachers make good use of technology in their lessons more than others, teachers with master's degree make good use of technology more than those with bachelor's degree, teachers with 0-5 years of professional experience use technology more than others. At the results of the research Özçelik and Kurt (2007) competency levels of 20-25 year- old teachers and teachers with 0-5 years of professional experience are higher than the other groups, there is a significant difference between the branch variable and computer self competency and between computer teachers and teachers of all other branches in favour of computer teachers, there is no significant difference between the gender variable and teachers' computer self-competencies.

Lawless and Pellegrino (2007) analysed 42 articles written in the U.S.A. after 1999 researching teachers' professional developments in technology and tried find an answer to the question "How technology use in lessons affect the outcomes of education?". It was concluded at the end of the analyses that the available research findings do not show technology leads to improvement in education, rather, improvement in education is provided through consistent teaching and evaluation supporting highly qualified learning. According to the results of the research, the issue to be concentrated upon in teaching and learning processes is not only the teachers' use of technology or their technology usage frequency but also how teachers will use technology with suitable pedagogical approach. Therefore, in order to reach the targeted learning outcomes at schools whose educational and teaching environments are enriched with information technologies thank to Fatih project, in order to get the desired results in the international examinations such as PISA and TIMSS, it is essential that educational policies be developed on how teachers will use technologies such as smart boards and tablet PCs with a pedagogical approach suitable for the content students should learn, it is essential to design teaching learning processes and design teaching at micro level. Ornstein and Lasley (2000) express that educational materials should be designed well and used in a planned way.

We would like to make some suggestions at the end of our research. Teachers should attend in service training activities regularly about computer ethics and how to use smart board effectively. The Ministry of National Education should prepare more learning objects and enriched books Educational materials should be designed well and used in a planned way. Teaching Programs should be updated with activities and instructions according to ICT. Teaching and learning processes should be designed at micro level Educational policies

should be developed on how teachers will use technologies such as smart boards and tablet PCs with a pedagogical approach suitable for the content students should learn.

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