Assessment of physics teachers' attitudes towards internet use in terms of some variables

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Abstract

The widespread use of internet implies the idea that it can also be more widely used for educational purposes. In this respect, since physics teachers have a very important function in education, to determine physics teachers' attitudes towards internet use is also important. In the literature it is possible to see many studies on teacher candidates' attitude towards internet use; "however studies on appointed teachers' attitude are not very common. In our study, which aims to determine the attitude of appointed teachers according to different variables, we used the Internet Use Attitude Scale. For the teachers that took part in the study the attitude towards internet use was analyzed and interpreted according to the variables of gender, years on the job, type of school at which they are teaching, and duration of their weekly internet use. It was seen that a vast majority of the teachers have personal computers, they connect to internet at home and have positive attitude towards internet use. It was also seen that female teachers have more positive attitude than male teachers in use of internet for social interaction and communication.

Keywords: Internet use, attitude, physics teacher

1. INTRODUCTION

It is obvious that the life style of societies is in a process of change, as new habits are acquired. Even though internet use is one of the new social habits, it is one of the most important factors that

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induce this change as regards the convenience it brings to communication and other areas. For instance radio has reached 50 million listeners in 38 years' time; internet on the other hand has reached this number in only 4 years (Lynch, 1998). Internet is described as a global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols (Oxford, 2010). Today internet is used in teaching, research, social interaction, communication and sharing of information (Odabaş et al., 2007). It is inevitable that teachers adapt themselves to the changes in the society; and adapt the new technology to their lives and teaching processes.

Internet, which is a part of life with its informative, communicative, educational and entertaining functions, is more widely used by children and teens, who can adapt themselves more easily to internet compared to adults (Tuncer, 2000). This can be regarded as an opportunity for the teachers. Teachers can ensure that students utilize internet more widely for educational and teaching purposes. That is why the attitude of teachers towards internet is important; as teachers are role models for the students and the society in general. The existence of internet is visible in every aspect of life; personal and professional.

Efforts to utilize internet more effectively in teaching are directly related to teachers' being information literate. Information literacy of teachers is expressed as "skills to gather, analyze, organize and present information" by Erdem and Akkoyunlu (2002). The view of "the internet opens classrooms to the world, the internet opens the world to classrooms" by Joo (1999) also suggests the importance that teachers should place on use of internet in teaching environments and processes.

Especially in physics education, applications of laboratory which require high cost and for this reason cannot be transported to class can be offered to use of students with applications of virtual laboratory. For instance, with using various java and flash programmes in computer and internet environment electric circuits are constituted and can be tried so that students have possibility for performing basic education subjects (Bülbül, 2006). Particularly, although there are computer laboratories in almost every school in our country, in only one of four schools there is a physics laboratory (Çıngı, Kadılar & Koçberler, 2007). This fact increases the importance of the application of virtual laboratory. Bozkurt & Sarıkoç (2008), in a study related with subject of alternate current with preservice physics teachers, compared the achievement of students' application of virtual laboratory and application of real laboratory and found the achievement of students very high in experimental group which used application of virtual laboratory.

The more advanced the teachers have a grasp of technology; the higher is their level of using this technology in courses (Becker, 1999). In this respect, it is important to determine the attitude of the teachers towards using internet which is a contemporary and technological product. When related literature is examined, (Tuncay & Uzunboylu, 2011; Arslan & Erdoğan, 2006; Birişci et al., 2009; İşman & Dabaj, 2004; Lenhart et al., Luan et al., 2005; 2010; Okay, 2010; Ocak, 2010; Schrader et al. 2003; Teo, 2008; Usta et al., 2007; Yalçınalp & Aşkar, 2003; Farajollahi & Moenikia, 2011; Çınar, Cakmak & Uzunboylu, 2009) there are various studies on the students' internet using however there are a few studies on in-service teachers' internet using (Rowand, 2000; Wallace, 2004).

To determine attitudes of physics teachers' towards internet using in view of developments in instruction and communication technology as regards different variables constitutes the purpose of the study. Problem sentences of the study are; Is there a statistically significant relationship between the teachers' attitudes towards internet using and gender, weekly duration of internet use, year on job and working school type variables?

2. METHOD

In the study descriptive model being one of the research methods, is used in order to determine the attitude of physics teachers towards internet use. Descriptive models are approaches that aim to describe an incident in the way it exists or used to exist. The incident that needs to be known exists and it is out there. The important issue is to observe it in an appropriate way and to detect it (Karasar, 1994). The data of the study were collected by means of "Internet Use Attitude Scale" developed by Tavşancıl & Keser (2002). The reliability coefficient (Cronbach's Alpha) of the scale is found to be 0,84 for this study. The Cronbach's Alpha reliability coefficient of the original scale is 0,89. The data were then analyzed and interpreted by means of SPSS 15.0. In the analysis of data about the demographic properties of teacher's frequency values were used. Independent sample t test was used in order to determine whether there is a significant difference among teachers' attitude as regards their gender. One way ANOVA was used in order to determine whether there is a significant difference among teachers' attitude as regards their years on the job, type of school at which they teach and duration of weekly use of internet. Reliability level is p=0,05.

2.1. Sample

The sample of the study consists of 90 volunteer physics teachers, who took part in the Physics Lesson Teaching Programs Course numbered 283 that was determined by In-Service Training Department of Ministry of National Education. Totally 120 physics teachers participated to the course. In the research, during the application 20 teachers not ready and 10 teachers who answered the questions incompetently were exclude from the sample. The teachers were selected randomly.

2.2. Data collection

The attitude of teachers towards internet use was determined by "Internet Use Attitude Scale" developed by Tavşancıl & Keser (2002); personal information was collected by "Personal Information Survey". In the attitude scale there are 31 items; of which 6 are negative and 25 are positive; in 6 factors. These factors are "use of internet in teaching, in research, social interaction, enjoying of the use in teaching, use in communication and in sharing information".

3. RESULTS

Below there is a summary of the findings from the study and some remarks on them. Table 1 shows type of the school served, years on the job, gender and title of teachers.

Table 1. Demographic properties of teachers that took part in the study

	Property	f	%		Property	f	%
				Years on the job	1-5	2	2,2
Gender	Male	71	78,9		6-10	23	25,6
					11-15	32	35,5
	Female	19	21,1		16-20	28	31,1
					21-+	5	5,6
	Natural sciences high school	10	11,1		Head teacher	1	1,1
Type of the school served	Anatolian high school	42	46,7	Title	Expert teacher	20	22,2
	General high school	18	20,0		Teacher	69	76,7
	Vocational high school	20	22,2		Intern teacher	0	0,0

As seen by Table 1, the majority of teachers that took part in the study are relatively junior in the profession. The ratio of the teachers who have been on the job for 11-15 years is 35, 5 %.

It was also found out that 94,4 % (n=85) of the teachers have computer at home; 82,2 % (n=74) connect to internet at home; 15,6 % (n=14) connect to internet at school. The ratio of the teachers who have been using internet for at least seven years is found to be 67,8 % (n=61). This situation is associated with the fact that a vast majority of the teachers are at a young age group. 53,4% (n=48) use internet for at least seven hours a week; 46,7% (n=42) use it for 1-6 hours a week.

In the study, the attitude of teachers towards internet used is analyzed statistically according to their gender by an independent sample t test. The results are given in Table 2.

Table 2. Independent sample t test analysis results according to gender*

Factor	Gender	f	$\overline{X}$	SD	Levene Test		df	t	p
					F	p			
Use of internet in teaching	Male	71	2,13	0,68	0,104	0,748	88	0,452	0,652
	Female	19	2,21	0,73					
Use of internet in research	Male	71	2,67	0,38	0,245	0,622	88	0,473	0,638
	Female	19	2,71	0,30					
Use of internet in social interaction	Male	71	2,92	0,94	0,000	0,990	88	0,622	0,536
	Female	19	3,07	0,93					
Enjoying of the use of internet in teaching	Male	71	2,92	0,58	0,482	0,489	88	1,059	0,293
	Female	19	3,07	0,57					
Use of internet in communication	Male	71	3,01	0,39	0,036	0,849	88	0,924	0,358

	Female	19	3,11	0,43					
Use of internet in sharing information	Male	71	2,22	0,82	0,601	0,440	88	0,438	0,663
	Female	19	2,13	0,70					

* p= 0,05

When table 2 was examined, although there were found differences between female and male teachers' attitude scores related scale factors, it was seen that differences were not statistically significant. So it can be said that physics teachers' attitudes related internet use does not depend on gender variable.

Table 3. One way ANOVA for the attitude of teachers towards use of internet as regards type of school*

Factor	Type of school	n	$\overline{X}$	SD	Sum of Squares		df	f	p
Use of internet in teaching	Natural Sciences High School	10	2,26	0,83	Between groups	0,306	3	0,212	0,888
	Anatolian High School	42	2,16	0,68					
	General High School	18	2,16	0,81					
	Vocational High School	20	2,06	0,52	Within group	41,337	86		
	Total	90	2,15	0,68					
Use of internet in research	Natural Sciences High School	10	2,89	0,37	Between group	0,823	3	2,189	0,095
	Anatolian High School	42	2,60	0,36					
	General High School	18	2,67	0,43					
	Vocational High School	20	2,76	0,25	Within group	10,781	86		
	Total	90	2,68	0,36					
Use of internet in social interaction	Natural Sciences High School	10	3,43	1,12	Between groups	2,991	3	1,152	0,333
	Anatolian High School	42	2,84	0,96					
	General High School	18	2,86	0,97					
	Vocational High School	20	3,01	0,69	Within group	74,446	86		
	Total	90	2,95	0,93					
Enjoying of the use of internet in teaching	Natural Sciences High School	10	2,95	0,65	Between groups	0,604	3	0,591	0,622
	Anatolian High School	42	2,94	0,61					
	General High School	18	2,82	0,66					
	Vocational High School	20	2,75	0,37	Within group	29,302	86		
	Total	90	2,88	0,58					
Use of internet in communication	Natural Sciences High School	10	3,30	0,57	Between groups	1,028	3	2,275	0,086
	Anatolian High School	42	3,02	0,39					
	General High School	18	2,90	0,32					
	Vocational High School	20	3,04	0,32	Within group	12,951	86		
	Total	90	3,03	0,40					
Use of internet	Natural Sciences High	10	2,60	0,88	Between	1,903	3	1,004	0,395

in sharing of information	School				groups		
	Anatolian High School	42	2,15	0,75			
	General High School	18	2,10	0,96			
	Vocational High School	20	2,21	0,69	Within group	54,334	86
	Total	90	2,20	0,79			

* p= 0,05

When table 3 was examined, although there were found differences between teachers' attitude scores related scale factors, it was seen that differences were not statistically significant. So it can be said that physics teachers' attitudes related internet use does not depend on type of working school variable. It can be considered normally that there were no statistically significant differences between different school types' teachers' attitudes. Even if teachers work in different types of schools, they have same physics and teachers' formation in their undergraduate levels. In this respect, it was evaluated as an expected finding that physics teachers' attitudes related internet use does not depend on their type of working schools.

In the study, we also aimed to analyze the attitude of teachers towards use of internet as regards the years they've been on the job. For this analysis we applied one way ANOVA to the data and the results are given in Table 4.

Table 4. One way ANOVA analysis for attitude towards internet use as regards years on the job variable*

Factor	Years on job	n	$\overline{X}$	SD	Sum of squares		df	F	p
Use of internet in teaching	6-10	25	1,92	0,71	Between groups	7,804	3	6,612	0,000
	11-15	32	2,19	0,63					
	16-20	28	2,11	0,54	Within group	33,839	86		
	21-+	5	3,28	0,63					
Use of internet in research	6-10	25	2,63	0,31	Between groups	0,569	3	1,479	0,226
	11-15	32	2,71	0,35					
	16-20	28	2,64	0,42	Within group	11,035	86		
	21-+	5	2,97	0,27					
Use of internet in social interaction	6-10	25	2,90	0,96	Between groups	0,691	3	0,258	0,855
	11-15	32	2,99	1,04					
	16-20	28	2,88	0,84	Within group	76,746	86		
	21-+	5	3,25	0,61					
Enjoying of the use of internet in teaching	6-10	25	2,79	0,58	Between groups	2,492	3	2,606	0,057
	11-15	32	2,84	0,54					
	16-20	28	2,87	0,60	Within group	27,414	86		
	21-+	5	3,55	0,45					
Use of internet in communication	6-10	25	3,04	0,51	Between groups	0,220	3	0,458	0,713
	11-15	32	2,98	0,35					
	16-20	28	3,04	0,33	Within group	13,759	86		
	21-+	5	3,20	0,45					
Use of internet in sharing	6-10	25	2,13	0,79	Between groups	5,818	3	3,308	0,024
	11-15	32	2,16	0,80					

information	16-20	28	2,13	0,67	Within group	50,419	86
	21-+	5	3,25	0,95			

* p= 0,05

When Table 4 is analyzed, it is seen that the mean of the total attitude points towards use of internet in teaching is the highest ($\overline{X}$= 3,28) for the physics teachers, who have been on the job for 21 years or more. Hence teachers, who have been on the job for 21 years or more have more positive attitude towards the use of internet in teaching. There is a significant difference between years on the job and the mean of total attitude points towards the use of internet in teaching ($F_{(3,86)}$= 6,612; p < 0,05). In order to find out among which group this difference results from, we applied Scheffe analysis in ANOVA and it is understood that the teachers on the job for 21 years or more have more positive attitude.

The mean of the total attitude points towards the use of internet in research is the highest ($\overline{X}$= 2,97) for the physics teachers, who have been on the job for 21 years or more. Hence teachers, who have been on the job for 21 years or more have more positive attitude towards the use of internet in research. There is no significant difference between years on the job and the mean of total attitude points towards the use of internet in research ($F_{(3,86)}$= 1,479; p > 0,05).

The mean of the total attitude points towards the use of internet in social interaction is the highest ($\overline{X}$= 3,25) for the physics teachers, who have been on the job for 21 years or more. Hence teachers, who have been on the job for 21 years or more have more positive attitude towards the use of internet in social interaction. There is no statistically significant difference between years on the job and the mean of total attitude points towards the use of internet in social interaction ($F_{(3,86)}$= 0,258; p > 0,05).

The mean of the total attitude points towards the use of internet in enjoying of the use of internet in teaching is the highest ($\overline{X}$=3,55) for the physics teachers, who have been on the job for 21 years or more. Hence teachers, who have been on the job for 21 years or more have more positive attitude towards enjoying of the use of internet in teaching. There is no statistically significant difference between years on the job and the mean of total attitude points towards enjoying of the use of internet in teaching ($F_{(3,86)}$= 2,606; p > 0,05).

The mean of the total attitude points towards the use of internet in communication is the highest ($\overline{X}$=3,20) for the physics teachers, who have been on the job for 21 years or more. Hence teachers, who have been on the job for 21 years or more have more positive attitude towards the use of internet in communication. There is no statistically significant difference between years on the job and the mean of total attitude points towards the use of internet in communication ($F_{(3,86)}$= 0,458; p > 0,05).

When Table 5 is analyzed, it is seen that the mean of the total attitude points towards the use of internet in sharing information is the highest ($\overline{X}$= 3,25) for the physics teachers, who have been on

the job for 21 years or more. Hence teachers, who have been on the job for 21 years or more have more positive attitude towards the use of internet in sharing information. There is a significant difference between years on the job and the mean of total attitude points towards the use of internet in sharing information ($F_{(3,86)}= 3,308$; $p<0,05$). In order to find out among which group this difference results from, we applied Scheffe analysis in ANOVA and it is understood that the teachers on the job for 21 years or more have more positive attitude. There was no statistically significant relationship between teachers' attitude scores' mean related scales' other factors and teachers' years on job.

In the study we also aimed to analyze the attitude of teachers towards use of internet as regards the weekly use of internet variable. For this analysis we applied one way ANOVA to the data and the results are given in Table 5.

Table 5. One way ANOVA for the attitude of teachers towards the use of internet as regards the weekly use of internet variable*

Factor	Duration/h	f	$\overline{X}$	SD	Source of variance	Sum of Squares	df	F	p
Use of internet in teaching	1-3	14	2,53	0,80	Between groups	2,633	3	1,935	0,130
	4-6	28	2,14	0,58					
	7-9	16	1,98	0,53					
	10-+	32	2,07	0,75	Within group	39,010	86		
	Total	90	2,15	0,68					
Use of internet in research	1-3	14	2,80	0,26	Between groups	0,239	3	0,602	0,615
	4-6	28	2,66	0,42					
	7-9	16	2,63	0,28					
	10-+	32	2,67	0,38	Within group	11,366	86		
	Total	90	2,68	0,36					
Use of internet in social interaction	1-3	14	3,46	0,79	Between groups	10,660	3	4,576	0,005
	4-6	28	3,13	0,90					
	7-9	16	2,34	0,69					
	10-+	32	2,87	0,97	Within group	66,777	86		
	Total	90	2,95	0,93					
Enjoying of the Use of internet in teaching	1-3	14	3,04	0,54	Between groups	1,419	3	1,428	0,240
	4-6	28	2,89	0,73					
	7-9	16	2,63	0,49					
	10-+	32	2,91	0,46	Within group	28,487	86		
	Total	90	2,88	0,58					
Use of internet in communication	1-3	14	3,11	0,41	Between groups	0,179	3	0,371	0,774
	4-6	28	2,99	0,41					
	7-9	16	2,98	0,37					
	10-+	32	3,05	0,40	Within group	13,800	86		
	Total	90	3,03	0,40					
Use of internet	1-3	14	2,73	0,85	Between	5,470	3	3,089	0,03

in sharing information	4-6	28	2,18	0,69	groups			1
	7-9	16	1,91	0,73				
	10-+	32	2,14	0,82	Within group	50,767	86	
	Total	90	2,20	0,80				

* p= 0,05

When Table 5 is analyzed, it is seen that the mean of the total attitude points towards the use of internet in teaching is the highest ($\overline{X}$=2,53) for the physics teachers, who use internet for 1-3 hours / week. Hence teachers, who use internet for 1-3 hours / week have more positive attitude towards the use of internet in teaching. There is no significant difference between the duration of weekly use of internet and the mean of total attitude points towards the use of internet in teaching ($F_{(3,86)}$=1,935; p > 0,05).

The mean of the total attitude points towards the use of internet in research is the highest ($\overline{X}$= 2,80) for the physics teachers, who use internet for 1-3 hours / week. Hence teachers, who use internet for 1-3 hours / week have more positive attitude towards the use of internet in research. There is no significant difference between the duration of weekly use of internet and the mean of total attitude points towards the use of internet in research ($F_{(3,86)}$=0,602; p > 0,05).

The mean of the total attitude points towards the use of internet in social interaction is the highest ($\overline{X}$= 3,46) for the physics teachers, who use internet for 1-3 hours/ week. Hence teachers, who use internet for 1-3 hours / week have more positive attitude towards the use of internet in social interaction. There is a significant difference between the duration of weekly use of internet and total attitude points towards the use of internet in social interaction ($F_{(3,86)}$=4,576; p < 0,05). In order to find out among which group this difference results from, we applied Scheffe analysis in ANOVA and it is understood that the results suggest that there is a significant difference in favor of teachers, who use the internet for 1-3 hours / week.

The mean of the total attitude points towards enjoying of the use of internet in teaching is the highest ($\overline{X}$= 3,04) for the physics teachers, who use internet for 1-3 hours / week. Hence teachers, who use internet for 1-3 hours / week have more positive attitude towards enjoying of the use of internet in teaching. There is no significant difference between the duration of weekly use of internet and the mean of total attitude points towards enjoying of the use of internet in teaching ($F_{(3,86)}$=1,428; p > 0,05).

When Table 5 is analyzed, it is seen that the mean of the total attitude points towards the use of internet in communication is the highest ($\overline{X}$= 3,11) for the physics teachers, who use internet for 1-3 hours/week. Hence teachers, who use internet for 1-3 hours/week have more positive attitude towards the use of internet in communication. There is no significant difference between the duration of weekly use of internet and the mean of total attitude points towards the use of internet in communication ($F_{(3,86)}$= 0,371; p > 0,05).

The mean of the total attitude points towards the use of internet in sharing information is the highest ($\overline{X}$= 2,73) for the physics teachers, who use internet for 1-3 hours / week. Hence teachers, who use internet for 1-3 hours/ week have more positive attitude towards use of internet in exchange of information. There is a significant difference between the duration of weekly use of internet and total attitude points towards the use of internet in sharing information ($F_{(3,86)}$=3,089; p < 0,05). In order to find out among which group this difference results from, we applied Scheffe analysis in ANOVA and it is understood that the results suggest that there is a significant difference in favor of teachers, who use the internet for 1-3 hours/ week.

There was no statistically significant relationship between teachers' attitude scores' mean related scales' other factors and teachers' years on job.

4. DISCUSSION and CONCLUSION

In this study, which aims to determine the attitude of physics teachers towards the use of internet, we have reached the following results: According to participating teachers' duration of weekly internet use variable, the teachers using internet 1-3 hours a week, have more positive attitudes towards the use of internet in instruction, research, social interaction, liking the use of internet in instruction, communication and sharing information. It can be understood from this result, teachers' spending more time with internet does not mean that the teachers use internet for the purpose of instruction.

The other important result of study is according to gender variable of physics teachers -in all factors of scale- , there is no statistically significant difference among total attitude scores' arithmetic means concerning the use of internet. Çelik and Bindak (2005) determined attitudes towards internet using do not change according to gender in a study of which the purpose was determine attitudes towards computer using of in-service teachers in elementary schools. Internet using is directly related to computer using, so it is an expected result that according to gender variable there is no statistically significant difference among the uses of internet. Thus Usta, Bozdoğan and Yıldırım (2007) have concluded that attitudes of pre-service teachers' towards internet do not change according to gender in their study. A similar result is attained in a study by Yılmaz (2008). Yılmaz determined that according to gender variable although male pre-service teachers have more positive attitudes than female pre-service teachers, this is not statistically significant. But Fidancıoğlu, Beydağ, Özer and Kızılkaya (2008) obtained a statistically significant difference according to gender variable for males in a study which aims to determine thoughts towards health high school's students' internet using.

Another important result of the study is, it is determined that generally the teachers have positive attitudes as regards internet using in instruction. For this reason it is thought that internet, being an important technological product with rapid developments in technology increases the positive attitudes in instruction. It is an obvious fact that with widespread applications of distant education,

internet will take a more clear part in instruction. Thus Okay (2010) has concluded that internet is used more intensively in situations such as doing homework and research in a study which aims pre-service teachers' internet using for the purpose of education. Luan at al. (2005) also revealed that undergraduate students use internet more for knowledge acquisition. Similarly Usta, Bozdoğan and Yıldırım (2007) determined students use internet more for the purpose of education in their study.

It is interesting that teachers who have been on the job for 21 years or more have more positive attitude towards use of internet in teaching. This reason is considered as teachers who have more experience in their job are in tendency to use internet more functionally and usefuly.

An impressive result obtained in this study is female teachers have more positive attitudes than male teachers towards internet using in social interaction and communication. This result is compatible with internet using in communication. That is female teachers have more positive attitudes than male teachers towards internet using in communication.

In today's world where unsynchronized and internet based education - teaching practices have become more common, the attitude of teachers towards use of internet in applied subjects such as physics education is an important factor that needs to be taken into account when applying these models. It is thought that this study will illuminate future internet based applications and studies in the field. Use of internet can make a major contribution to not only physics education but also all education areas, so by this purpose awareness should be consisted for the entire teacher.

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