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Perceptions of the Internet and Education: A Study with Physics Education Website Users

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Abstract: The use of the web in teaching and learning and research studies on this issue are increasingly common in science education. In most of these studies, teachers' and students' perceptions of and their attitudes toward the specific web-assisted/based learning activities and the effects of these activities on their achievement and attitudes have been investigated. In the current study, the researcher placed emphasis on the perceptions about physics education related websites on the Internet among users of these sites using a causal-comparative research design. The purpose of the current study was to have detailed information on web users' preferences and perceptions on the use of the web and to see if demographics are responsible for differences on web users' perceptions on the use of web in physics education. In order to achieve this aim, an online instrument, *Perceptions of the Internet and Education Scale*, was developed by the author and the data collected using this instrument. The statistical analyses were carried out with the data from 340 web-users of a physics education related website. The results of the study showed that web users' gender, occupation, and time spent on the Internet were factors that explained the changes in the perceptions of physics education web users. However, web users' age and past experiences with the Internet were not causes of that difference.

Keywords: perceptions of internet; use of internet in physics education; factors affecting perceptions; web-based/assisted learning

Introduction

The use of the Internet has increased all around the world as well as in Turkey. Statistics show that 34% of the world population, which consists of almost 2.4 billion people, has access to the Internet. Similarly, the number of Internet users in Turkey constitutes 44% of the population of the country (InternetWorldStats, 2012). Obviously, the total number of users of the web is not enough to make sense about how the Internet becomes a part of our lives. To get more insight, we

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should compare the present number of users with those in the past. In 2000, there were only two million Internet users in Turkey (Gökalp, 2011, p. 13) whereas the current number of users is almost 34 million (InternetWorldStats, 2012). This shows that, within 12 years, the Internet has become very popular and the number of users has increased by 1700%. The extensive use of the Internet also affects educational practices. Nowadays, with the extensive use of computers for instructional purposes, it is not surprising that the Internet is one of the most popular media for conveying instructional materials and methods to learners (see Kulik & Kulik, 2002 and Šorgo & Kocijančič, 2012 for computer-based methods). The Internet attracts many researchers and teachers, leading to extensive research studies to investigate the use of this medium for instructional purposes (eg. Büyükyazı, 2007; Fancovicová, Prokop, & Uşak, 2010; Gökalp, 2011).

While the Internet has become to be an attractive medium, several terms have been used to describe its usage for instructional purposes like Web-based instruction (WBI) and web-assisted instruction (WAI). These are general terms to express the use of the web as the source of instruction which conveys all of the instructional activities or as the tool to assist the instructional process, respectively. In both cases, web-based materials and applications are used. Most of the time, these materials and applications are supplied by already established education related websites. These websites are being used by many students for various reasons. Of course, education is not the only reason why students are on the Internet. Demirbilek, Cilesiz, and Tozoglu (2001), in their study, found that 30% of the students at the age of 16-22 use the Internet for entertainment, while only 10% of them use it for educational purposes. In another study, Gökalp and Eryılmaz (2009) asked web users about what they would like to see in a physics education website. The results of their study showed that 70% of the web users wanted to see educational games in an education website, whereas, 40% of them thought that chat rooms are one of the important sections that should be in a physics-related website. These two studies reveal that the actual web users place importance on entertainment even in the Internet. A survey carried out by the Turkish Statistical Institute shows that 47% of the houses in Turkey have Internet connection. Furthermore, 23% of the people use mobile devices to connect to the Internet. The majority of people (72%) use the Internet as a news source (TÜİK, 2012).

There are several research studies on students' perceptions of the WBI and WAI instructional methods. Hong, Lai, and Holton (2003), in a study with 26 students, reported that undergraduate students' feels that web-based courses increase communication among students and between students and the teacher. In the same study, the students expressed that they believed to be more successful with the use of web-based approaches. Similar to Hong et al. (2003), Koohang and Durante (2003) also carried out their research with undergraduate students. They measured 106 students' perceptions on web-based learning activities in a distance education program. In that study, it was found that the students perceived that web-based activities increased their learning. Moreover, age and gender were not the factors affecting this perception. On the contrary, it was found that the students' past experiences with the Internet was a factor that changed the students' perceptions. There are similar studies in the research literature that have investigated undergraduate students' perceptions about an implemented web-based learning activity (Paterson, 1999; Tesone & Ricci, 2008). Tesone and Ricci (2008) compared the perceptions of instruction between students in online and regular classes. There were 450 students in their study. They reported that no statically significant difference in the perceptions was found. On the other hand, Solem (2001) investigated geography faculty members' perceptions of Internet-based teaching in order to identify the factors affecting the use of Internet-based teaching in their courses. The results of his study showed that the ones who perceived the benefits of the Internet tended to use it in their courses more often. Flanagin and Metzger (2000) conducted a different study from the others; they investigated undergraduate students' perceptions of the credibility of information from the Internet. They collected the data from 1,041 un-

dergraduate students and the results of the study showed that participants were of the opinion that information from the Internet could be trusted as much as that from television, radio, and magazines but not as much from newspapers. In conclusion, it can be said that most of the research studies on the perceptions focused on specific WBI and/or WAI features; even some of them mainly investigated the effect of the several methods on the learning outcomes and attitudes and reported students' perceptions of those methods. However, Hinson, Distefano, and Daniel (2003) took Internet perception itself and developed a scale to measure primary students' levels of self-efficacy in the use of the Internet.

Determining web-users' perceptions on the use of the Internet in education helps us to implement the WAI and WBI methods in our courses. By doing so, we can know our intended audience in greater detail. Moreover, outlining the possible causes of the changes in perceptions helps us to design and convey instruction with respect to each factor. Therefore, we should know more about regular web users. In this study, regular web users of a physics related website were taken into account. The purpose of the current study was to have detailed information on the web users' preferences and perceptions on the use of web and to ascertain causes of differences on web users' perceptions on the use of the web in education. Based on this purpose, the researcher aimed to answer the question "What are the causes of the differences about the Internet and education perceptions of web users?" Thus, attention was given to variables such as age, gender, occupation, and experience level of users. Moreover, the amount of time spent on the use of the Internet was also the focus of this study.

Method

Design of the Study

In order to answer the research question, the casual-comparative research method (Fraenkel & Wallen, 2006, p. 370) was employed. This research method is preferred over experimental methods because it allows determining the causes of differences that already exist among the several groups that are being studied.

Sample

The sample of this study consisted of 340 web users who were drawn from the population using the purposive sampling method. It was aimed to have web users of a physics-related website. This website serves contents on physics and physics education from primary to graduate level. The language of the website is Turkish. It is easily accessible with a simple search on search engines with the keyword of "fizik" (Turkish word for physics). Beside the visitors from search engines, there are also around 27,000 registered users of the website. As the sample of this study was from this website, generalizability of the results is limited to the populations with similar demographics as follows: (1) Most of the participants are interested in physics; (2) 69.2% of them were male and 30.8% of them were female; (3) Most of the participants are from big cities (32% from İstanbul, 9% from Ankara, 6,7% from İzmir, and 4% from Bursa); (4) 12.8% of the participants were in the age group 10-15; (5) 21.1% of them were in the age group 16-20; (6) 22.4% of them were in the age group 21-25; (7) 10.9% of them were in the age group 26-30; and (8) the rest of them were older; (9) the mean age of the participants was 27.9; (10) 8.4% of the participants were second level primary school (grade 5-8) students; (11) 13.1% of the participants were high school (grade 9-12) students; (12) 24.8% of the participants were undergraduate students; (13) 2.7% of the participants were graduate students; (14) 23.9% of the participants were teachers; (15) 4.8% of the participants were engineers; and (16) about 20% of the participants were from other professions.

Table 1. *Item analysis results of the PIES*

Item #	Mean	Item-scale correlation
1	4.012	0.738
2	3.926	0.653
3	4.065	0.755
4	3.785	0.691
5	3.560	0.719
6	3.806	0.749
7	4.159	0.738
8	4.441	0.505
9	3.649	0.366
10	4.124	0.751
11	2.950	0.298
12	3.797	0.751
13	3.735	0.797
14	3.593	0.757
15	3.792	0.374
16	4.021	0.770
17	3.973	0.501
18	3.246	0.398
19	3.883	0.349
20	3.840	0.784
21	3.657	0.711
22	3.415	0.601
23	3.943	0.753
24	4.140	0.754
25	4.180	0.776
26	3.861	0.767
27	3.692	0.765
28	3.473	0.602
29	3.660	0.660
30	3.571	0.132

Assessment Tool

In this study, the data were collected with an online instrument, the *Perceptions of the Internet and Education Scale* (*PIES*) that was developed by the author. This instrument has three parts. The first part of the instrument was designed to measure perceptions on the use of the Internet. This part had 20 Likert-type items which are rated on a five point scale: strongly disagree, disagree, neutral, agree, and strongly agree. The possible minimum and maximum scores are 20 and 100 respectively for this part. The second part of the instrument consisted of four questions about the demographics of the subjects. The final part of the instrument had 12 questions that were designed to solicit information on the web users' preferences on the use of the Internet.

At the beginning of the development process, previous studies related to the perceptions about the Internet and web-based/web-assisted instruction were reviewed (e. g., Flanagin & Metzger, 2000; Gökalp & Eryılmaz, 2009; Hong et al., 2003; Koohang & Durante, 2003; Paterson, 1999; Tesone & Ricci, 2008). Then, 12 Likert-type items, related to perceptions on education and the Internet, were constructed. Moreover, besides the perception related items, 18 more questions about the web users' demographics and preferences on the use of the Internet were developed. This first version of the scale, along with the purpose of the scale, was given to two experts who had PhD degree in computer education and instructional technology for content validation. The feedback was positive and indicated that the items were well-written with respect to the purpose. Then, this

Table 2. *Component matrix*

Item #	1	2	3	4
Item 21	,862			
Item 27	,831			
Item 20	,821			
Item 13	,770			
Item 28	,736			
Item 25	,680		,343	
Item 24	,631		,327	
Item 29	,577		,329	
Item 22	,557	,482		
Item 3	,540	,347	,388	
Item 7	,499	,404		,351
Item 5		,879		
Item 14	,300	,827		
Item 4		,782		
Item 26	,344	,758		
Item 6		,757		
Item 12	,336	,693		
Item 1		,669		
Item 23	,460	,533		
Item 2		,515	,455	
Item 17			,766	
Item 16	,495		,561	
Item 18	,336		,508	
Item 10	,461	,366	,482	
Item 9			,461	
Item 8				,719
Item 30				,611
Item 19				,604
Item 15				,604
Item 11				-,434

version of the scale was published on the physics-related website mentioned in the previous section. In this pilot phase, 510 web users completed the instrument and the data were analyzed. The results of this pilot phase was presented by Gökalp, Uşak, and Düzenli-Gökalp (2012) at the 6th International Computer & Instructional Technologies Symposium (ICITS 2012). The Cronbach's alpha coefficient for the first version of the scale was calculated and found to be 0.88. Moreover, exploratory factor analysis (EFA) was carried out and it was found that all the items loaded on the same dimension which explained 45% of the total variance. Furthermore, item analyses were carried out to study the item-scale correlations of each item. Based on the results of the data analysis, the researcher decided to add more questions and dimensions to the scale. Twenty items were taken and modified based on the work of Hinson et al. (2003). Their scale was intended to be used in primary classes. The items were modified with respect to general web users and translated to the Turkish. The translated items were checked by two language experts: one of the experts

Table 3. *Item distribution of the PIES in the dimensions*

Dimension	**Item #**
Self-efficacy in Internet	1, 2, 3, 4, 7, 9, 17
Internet and education	5, 6, 10, 11, 12
Psychological state	8, 13, 14, 15, 16, 18, 19, 20

was a Turkish language expert and the other was an English language expert and native Turkish speaker. Beside these 20 items, 10 of the previous items were added to the scale. These 30 Likert-type items and the other 18 questions about the demographics and preferences of the web users' were published on the physics related website again. The scale was responded to by 340 web users. The final analyses were carried out using these data. In the first step, item analysis was performed. The results of the item analysis are summarized in Table 1. If the item-scale correlation value was (1) greater than 0.40, the item was functioning quite satisfactorily, (2) between the values of 0.30 and 0.40, the item was functioning well (Item 9, 15, 18, and 19), (3) between the values of 0.20 and 0.30, the item needed revision (Item 11), (4) below 0.19, the item should be deleted or completely revised (Item 30) (Crocker & Algina, 1986, p. 315). Based on these criteria, Item 11 and Item 30 were deleted from the further analyses.

The second step of the validation process was to perform the EFA. This analysis was performed to elucidate the proposed factor structure and to determine whether or not the items were perceived differently by the participants. The KMO measure of sampling adequacy (0.94) was acceptable and the Barlett test of sphericity was significant which showed that the correlation matrix was not an identity matrix. Therefore, the results of the EFA were acceptable. The EFA proposed four factors that accounted for 66.85% of the variance of the data. This means that those four factors measured what they were supposed to. However, when the component matrix was examined, it was seen that several items loaded on multiple dimensions (See Table 2). Moreover, it was seen that negatively worded items also loaded on a separated dimension. With the results of the EFA, eight more items were deleted from further analysis and a new 3-factor structure was proposed with 20 items: self-efficacy in Internet, Internet and education, and psychological state (see Table 3 for item distribution in the dimensions). This factor structure was tested with confirmatory factor analysis (CFA). The CFA is needed to confirm factor structure of the instrument. This analysis was conducted to ascertain whether or not the proposed 3-factor Internet perception model fit the data well. These three factors represented latent variables and the CFA was carried out using the Weighted Least Squares (WLS) estimation method. The WLS was preferred because it was the most suitable option when dealing with ordinal data (Flora & Curran, 2004).

Several fit indices other than chi-square statistic were considered for the fit assessment of the model. The chi-square statistic was not used because of its sensitivity with the sample size (Bentler & Bonett, 1980; Fan, Thompson, & Wang, 1999). Therefore, the Comparative Fit Index (CFI; Bentler, 1990), Normed Fit Index (NFI; Bentler & Bonett, 1980), and Root-Mean-Square Error of Approximation (RMSEA; Steiger, 1990) were used to assess the proposed structure. Moreover, relative chi-square, which is the "chi square/degree of freedom" ratio, was also assessed. CFI and NFI indices with values over 0.90 indicated good fit. Moreover, the RMSEA values were less than 0.05 indicating close fit (Browne & Cudeck, 1992). The relative chi-square should be less than 5 if the model fits to the data. The CFA with the sample of 340 web-users yielded 0.99 CFI, 0.99 NFI, and 0.1 RMSEA (0.90 CI = 0.093; 0.108) indicating good fit except for the value for RMSEA. Similarly, the relative chi-square was found to be 4.41, which also indicated good fit. Moreover, the loadings of each observed variable on the corresponding latent variable showed reasonable sizes to support the latent variables that were used in the proposed model.

Table 4. *Identification of the variables used in the study*

Type	Name	Cont/Discr	Scale	Measured by
Dependent	Perception	Continuous	Interval	Scores of the first part of the PIES
Independent	Gender	Discrete	Nominal	Question in the second part of the PIES
Independent	Age groups	Discrete	Ordinal	Question in the second part of the PIES
Independent	Occupation	Discrete	Nominal	Question in the second part of the PIES
Independent	Level of experience	Discrete	Ordinal	Question in the third part of the PIES
Independent	Amount of time spent on browsing	Discrete	Ordinal	Question in the third part of the PIES

The Cronbach's alpha coefficient for the *PIES* was found to be 0.94. This is one of the measures to show reliability of the data. Moreover, Cronbach's alpha coefficient was calculated for each dimension. For the dimensions "self-efficacy in Internet", "Internet and education", and "psychological state", the coefficients were found to be 0.93, 0.72, and 0.93, respectively. From the results given above, it can be concluded that the *PIES* was reliable and valid for the sample that was studied.

Variables There were six variables, one dependent and five independent, that were used in the inferential statistical analyses. The variables used in the analyses are provided in Table 4. The dependent variable is "perception" which is continuous and rated in an interval scale. The independent variables of the study are "gender", "age groups", "occupation", "level of experience", and "amount of time spent on browsing the Internet".

Results

Descriptive Statistics

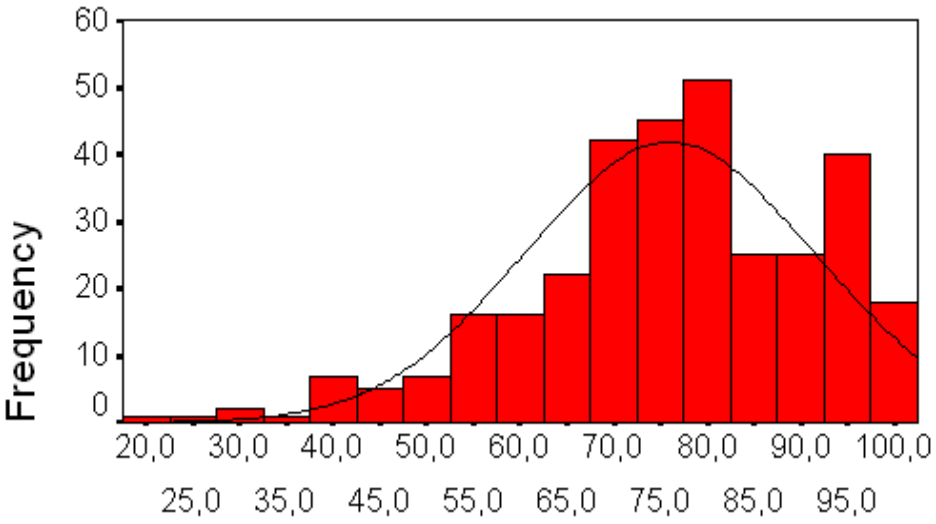

Figure 1. *Histogram with normal curve for the PIES scores*

First, the descriptive statistics were calculated for the scores of the first part of the *PIES*. The mean, median, mode, and standard deviation were found to be 75.97, 77.00, 79.00, and 15.44, respectively. This shows that overall perceptions were somehow high because the possible maximum score was 100. These statistics also can be seen in the histogram (See Figure 1). As can be seen in that histogram, the distribution is skewed to the left. However, the values for the mean, median, and mode were close to each other, which should be same in a normal distribution. Skewness and kurtosis values were -0.67 and 0.47 respectively. In a normal distribution, standardized skewness and kurtosis values should be less than 1.96. The standardized values of skewness and kurtosis were found to be -4.96 and 1.74, respectively. Again it can be seen from those values that the distribution

Table 5. *Descriptive statistics for Internet usage habits and preferences*

Internet usage habit and preferences	**Frequency**	**Percentage**
Computer at home		
Not available	11	3.3
Available	324	96.7
Internet connection at home		
Not available	24	7.2
Available	309	92.8
Internet connection via mobile devices		
No	128	38.2
Yes	207	61.8
Use Internet for studying (optional)		
No	21	6.2
Yes	191	56.2
Length of Internet experience		
Less than a year	5	1.5
1-2 year	7	2.1
3-4 year	34	10.2
5-6 year	54	46.2
7-8 year	85	25.5
9-10 year	51	15.3
11-12 year	43	12.9
More than 13 year	54	16.2
Preference to get information		
Television	9	2.7
Newspaper	4	1.2
Internet	304	91.3
Magazine	3	0.9
Radio	2	0.6
People	11	3.3
Internet access location		
Home	252	75.2
School	15	4.5
Dormitory	18	5.4
Work	39	11.6
Internet cafe	11	3.3
Hours spent in Internet in a week		
0-5	68	20.4
6-10	65	19.5
11-15	48	14.4
16-20	34	10.2
21-25	38	11.4
26-30	31	9.3
30 +	50	15

is significantly skewed. However, Tabachnick and Fidell (2007) state that "in a large sample, a variable with statistically significant skewness often does not deviate enough from normality to make a substantive difference in the analysis" (p. 80). Here the sample was large enough to say that this skewness did not violate the normality.

In addition to the descriptive statistics of the first part, the descriptive statistics for the second and third parts of the *PIES* were calculated (See Tables 5 and 6). These results should be taken into account when wanting to generalize the findings of the study to another situation. It can be seen from Table 4 that almost all of the participants had an internet-enabled computer in their homes. Not surprisingly as the participants were from an education related website, half of the participants used the Internet for studying purposes. It can be seen that 61.8% of the participants used their mobile devices to connect to the Internet. Moreover, it is clear that many of the web users (46.2%) had access to the Internet for 5-6 years and most of the users (91.3%) preferred the use of the Internet to get the information that they needed. Table 5 summarizes the descriptive statistics of web users' experiences with the Internet. It can be seen that 77.4% of the web users used the Internet for educational research. This is followed by communication (69.7%) and social networking (65%). However, using the Internet for gaming and entertainment was not very popular among these web users (47.1%). This trend may be because the mean age of the participants was 27.9. The major problem and the most frustrating hurdle that was faced by the

Table 6. *Descriptive statistics for web users' experiences with the Internet*

Experiences with Internet	**Frequency**	**Percentage**
I use Internet for (in general)		
Educational researches	263	77.4
Online learning	55	16.2
Homework	148	43.5
Communication	237	69.7
Social networking	221	65
Shopping	120	35
Banking	102	30
News	183	53.8
Game/entertainment	160	47.1
The most important obstacle I faced in Internet		
Slow connection speed	225	66.2
Invoices	149	43.8
Unable to find information needed	126	37.1
Hard nature of Internet	19	5.6
Technical difficulties with computer	9	2.6
The most important problem in Internet		
Connection speed	205	60.3
Privacy	127	37.4
Information credibility	193	36.8
Pornographic contents	127	37.4
Cyber crimes	129	37.9
Copyright issues	89	26.2
Not having equal opportunities	57	16.8
I find the websites that I need by		
Researching at search engines	319	93.8
Following links on other websites	151	44.4
Suggestions of others	107	31.5
Links on computer magazines	59	17.4
Advertisements in media	46	13.5

Table 7. *Mean of the perception scores from different age groups*

Age group	Mean
10-15	81.36
16-20	72.59
21-25	77.45
26-30	78.78
30+	74.94

participants was the slow connection speeds. Most of the users (93.8%) found the websites by performing a search using search engines, while almost half of the web users (44.4%) followed the links on the websites to reach the other websites.

Inferential Statistics

In order to investigate the causes of the differences about the Internet and education perceptions of web users, independent sample t-test and one-way analysis of variance (ANOVA) were used. These analyses have five assumptions which are satisfied as described below:

- Level of measurement of the dependent variable has to be continuous. This assumption was met. Here, the dependent variable was the total score on the *PIES*. This variable had continuous values.
- The data should be collected from a random sample. This assumption is not met in most studies. Similarly, in the current study the sample was not a random sample drawn systematically from the population because the respondents volunteered to participate via the Internet.
- Each observation should be independent. This means that the participants should not influence each other's answers to the questions in the *PIES*. In the current study all the participants had different IP addresses and came from different cities. Therefore it was unlikely that the independence assumption was violated in this study.
- The data should be normally distributed. This can be checked by looking at the values given in previous section. As can be seen, this assumption was also met.
- The variability of each group should be equal. This assumption is also known as homogeneity of variance. This assumption can be checked with Levene's Test of Equality of Variances. However, violation of this assumption is not crucial for performing the ANOVA (Pallant, 2007, p. 204).

The inferential statistics were conducted for each independent variable. Firstly, in order to see if the gender of web users could cause a difference on their perceptions an independent sample t-test was carried out. The results of the independent sample t-test [$t(321) = 2.34$, $p < 0.05$)] showed that there was a significant difference between the *PIES* scores of the male web users ($M = 77.33$, $SD = 15.88$) and the female users ($M = 72.98$, $SD = 13.98$).Secondly, in order to see if there is difference among the perceptions of web users from different age groups about the use of the

Table 8. *Means of the perception scores from different occupations*

Occupation	Mean
Student (grade 5-8)	80.16
Student (grade 9-12)	81.81
Student (undergraduate)	71.24
Student (master)	76.78
Student (doctorate)	82.00
Student (college)	74.25
Teacher	75.26
Academician	70.29
Engineer	80.25
Laborer	75.40
Civil servant	82.29
Other	75.53

Table 9. *Means of the perception scores across different levels of Internet experience*

Level of experience	Mean
Less than a year	70.50
1-2 years	61.80
3-4 years	73.36
5-6 years	73.06
7-8 years	76.98
9-10 years	76.88
11-12 years	77.27
13+ years	79.52

Internet in education one-way ANOVA was performed. At this step, the age variable was recoded into sub-groups. Then, one-way ANOVA was performed. The results showed that there was no significant mean difference between the perception scores of the different age groups [F(6,316) = 1.96, P > 0.05]. The mean of the Internet and education perceptions of web users from different age groups can be seen in Table 7. One other independent variable of the study was occupations of the web users. In order to check if the perceptions of web users from different occupations about the use of the Internet in education differs or not, one-way ANOVA was performed. The results of the ANOVA showed that there were differences among the groups. [F(11,310) = 1.84, P < 0.05]. However, the results of the post-hoc analysis should be checked to see which groups differed from the others. In order to see these differences, the Tukey post-hoc test was performed. The results showed that high school students (M = 81.81, SD = 16.15) and undergraduate students (M = 71.24, SD = 15.38) differed from each other with respect to their *PIES* scores ($p < 0.05$). The means of the Internet and education perceptions of web users from different occupations can be seen in Table 8.

One other one-way ANOVA was performed to see if there is a difference among the perceptions of web users who have different levels of experience about the use of the Internet in education. It was found that there was no significant mean difference in the *PIES* scores among the web users who had different levels of experience with the Internet. [F(7,312) = 1.63, P > 0.05)]. The means of the Internet and education perceptions of web users who have different levels of experience with the Internet can be seen in Table 9.

Lastly, In order to test if there is a difference between the perceptions of web users who spend different amounts of time in a week browsing the Internet one-way ANOVA was performed. The results showed that there are differences among the groups [(F(6.314) = 6.568, p < 0.05)]. The post-hoc analysis showed that there was a difference between the participants (1) who spent 0-5 hours in a week and those who spent 16-20 hours, (2) who spent 0-5 hours in a week and who spent 36-40 hours, (3) who spent 0-5 hours in a week and who spent more than 40 hours ($p < 0.05$). Moreover there was significant difference between those (1) who spent 6-10 hours in a week and those who spent 16-20 hours, (2) who spent 11-15 hours in a week and who spent 16-20 hours ($p < 0.05$). The means of

Table 10. *Means of the perception scores across different amount of time on browsing the Internet in a week*

Time spent	Mean
0-5 hours	68.44
6-10 hours	74.66
11-15 hours	73.88
16-20 hours	85.58
21-25 hours	76.00
36-40 hours	79.90
40+ hours	81.08

the Internet and education perceptions of web users who spent different amounts of time on browsing the Internet in a week can be seen in Table 10.

Conclusion, Discussion, and Implications

In the current study, the possible causes that resulted in differences of perceptions of the Internet and use of the Internet in education were investigated. The data support that gender is one of the causes that results in that difference. However, the effect size should be taken into account to see if this is practically significant too. Eta squared was calculated with the formula given in Pallant (2007, p. 236). Here, eta squared was found to be 0.02. According to Cohen (1988, pp. 284-297), this indicates a small effect. Therefore, it can be concluded that there is statistically significant but small effect of gender on the Internet perceptions. One other finding of the study is that the data support that the ages of the web users did not result in a difference among their perceptions. In other words, old or young people, no matter their age had similar perceptions of the Internet and its usage in education. Moreover, the results suggested that the occupation of web users was one of the causes of the differences of their perceptions. A statically significant difference in perceptions was found between high-school students and undergraduate students. The effect size of the ANOVA can be calculated by dividing the sum of squares between groups to the total sum of squares. The effect size (eta squared in this case) was found to be 0.06 which indicates a small effect. This shows that despite having statistical significant difference, the difference between undergraduate and high-school students is negligible. The fourth finding of the study was that there were no significant differences among the perceptions of the web users with different lengths of experience with the Internet. This means that the changes in the perceptions did not result from the web users' level of experience. However, the data supported that the differences in the perceptions about the Internet could be due to the length of time spent on the Internet in a week. The eta-squared for this factor was found to be 0.11. This small effect shows that it is only statistically significant but it is not practically significant. In addition to the analyses detailed in Section 3.2, the researcher employed two-way ANOVA analysis to find out if the difference among the groups who spent different amounts of times on the Internet depended on the gender of the web users. The interaction effect was not significant; therefore, it can be concluded that the differences were not influenced by gender.

Unfortunately no similar study has been identified by the researcher for the purpose of making comparisons. As mentioned in the introduction section, the studies in this area mostly focused on specific methods. For example, Koohang and Durante (2003) investigated students perceptions on web-based activities in a distance learning program. In their study, they concluded that students' age and gender did not affect their perceptions; however, their past experiences with the Internet indicated a difference in their perceptions of web-based activities. On the contrary, it was found that gender is one of the factors causing differences in perceptions, although this was not practically significant. Moreover, it was found that the web-users' past experience with the Internet was not one of these factors. It should be noted that Koohang and Durante (2003) conducted their study when the web was still fairly new. Nowadays, as can be seen from TÜİK (2012) and InternetWorldStats (2012), the Internet is becoming a part of life and people have accustomed to its use. Therefore, it is not unexpected that experience with the Internet did not affect perceptions of the subjects in their study. Besides the study of Koohang and Durante (2003), other studies focused on specific WBI/WAI methods to elucidate students' perceptions of the features of these methods (Hong, Lai, & Holton, 2003; Paterson, 1999; Tesone & Ricci, 2008).

In addition to perceptions of web users, information on their preferences on the use of the Internet was also collected during the current study. One of the surprising results was that most of the participants (61.8%) connected to the Internet with their mobile devices. On the contrary, with respect to results of the TÜİK (2012), only 23% of the Internet users used mobile devices as a means of connecting to the Internet. This shows that targeted users of education related web-sites have a higher rate of use of mobile devices than other users.

This finding is important because it draws out attention to the importance of having mobile-based versions of instructional materials. Instructional designers should therefore, place greater emphasis on the production of instructional materials that use mobile devices. Moreover, pre-service teachers should need to be provided with training on the use of mobile devices to browse the Internet and to use these devices as a part of teaching/learning processes.

One other result from the descriptive parts of the analyses shows that the half of the web-users used the Internet to access entertainment and education related websites. Similar findings have been reported by other researchers (Demirbilek et al., 2001; Gökalp & Eryılmaz, 2009). This issue should not be overlooked when we create web-based instructional materials. The materials allowing users to engage in an entertaining activity may result in a higher success.

As can be seen from the results given above, there are many Internet users who use the Internet on their mobile devices. The instructional designers should put more emphasize on the mobile version of the instructional materials. Moreover, pre-service teachers should get some training on the use of mobile devices to browse Internet and having these devices as a part of teaching/learning processes. Furthermore, although there is only a small effect, perceptions of male Internet users differ from that of female users. By taking this into account, web-based instructional materials can be prepared by adding several elements to attract both male and female users.

The current research focused on the web-users who have interests in physics. In order to see if gender, occupation, and amount of time spent on browsing the Internet are factors affecting the Internet and web-based education perceptions, more studies should be carried out with other web users. Moreover, other factors with possible effects on the Internet and web-based education perceptions should also be evaluated. Finally, this study was a casual-comparative study; therefore, there were no manipulations of the independent variables involved. However, it is clear that without such manipulations it is difficult to predict if those independent variables have any directional effects on the dependent variable being studied. Therefore, several experimental studies could be conducted in the future studies.

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