Education and Science

Vol 40 (2015) No 179 383-402

# Examining Information in Web Environment Searching and Commitment Strategies of University Students According to Demographic Variables

Aynur Geçer [1], Nejat İra [2]

**Abstract**

Millions of people all over the world use the internet so as to communicate or search a topic to get information today. There are several sources about any topic on the internet. Even though there are some misleading ones, there are perfect ones, as well. Therefore, what is important about this issue is to determine whether this electronically acquired information is reliable, true and of high quality or not. If it is, to what extent it is reliable? The purpose of this research is to determine whether information searching and commitment strategies of university students vary according to demographic variables. Quantity method was used in the research, and relational scanning model was preferred among all scanning models. 370 students at Education Faculty, Science and Literature faculty and Engineering faculty of Kocaeli University were included in this research. The questionnaire of information searching and commitment strategies on the internet developed by Wu and Tsai (2005) was used in the research. At the end of the research, it was observed that university students use developed strategies more than others. The highest grade about the strategies of information searching and commitment goes to the statement: ' I can combine the information that I collect from various web sites, whenever I need to get information.' It can be expressed that university students have the necessary ability to compare the information from different web sites and combine it so as to reach the accurate and reliable information. Anova was used to determine whether the strategies of searching and commitment of information vary according to the frequency of daily internet use. No significant difference was observed, though.

**Keywords**

Evaluation standards

Commitment

Information searching strategies

University students

**Article Info**

Received: 03.03.2014

Accepted: 02.03.2015

Online Published: 05.20.2015

DOI: 10.15390/EB.2015.3131

[1] Kocaeli University, Turkey, Education Faculty, Computer Education and Instructional Technology, Turkey, akolburan@kocaeli.edu.tr

[2] Kocaeli University, Turkey, Education Faculty, Elementary Education, Turkey, nejat.ira@gmail.com

## Introduction

In today's world, it is very easy to reach the information, thanks to the developing science and technology. The internet, which is one of the easiest ways to get information, is the best example of this. Millions of people all over the world use the internet so as to communicate, search and find out information about any topic. Education is one of the branches where the internet is frequently used. Several researchers state that the internet is consistent with the learning environment in the configurable approach in web-based education. They also say that not only does the internet provide the students with the flexibility of time and place; it also helps them to form the information and learn in a remarkable way. (Chou and Tsai 2002; Relan and Gillani 1997; Tsai 2001).

One of the essential sources to get information for the university students is the internet. According to the research performed by Balci, Golcu and Ocalan (2013), the reasons why university students use the internet can be defined as to meet the need of getting news and information, to be aware of what is happening in the world or in Turkey, to communicate because it is the fastest and easiest way to do this, and it has versatile communication means.

The students at the Education Faculty in the university system ought to learn the ways to reach the information as it is very important for the features of a teacher. According to the results of the research done by Gunuc, Odabasi and Kuzu (2013), called 'A twitter application'; pre service teachers define the features of 21st century university students as the personals skills (cognitive, internal and social), information-searching skills (search, learn and acquire the information), creativity, innovation and career skills ( career and innovation), technology skills ( the use and intensification). Besides this, all the research done on this issue, illustrates that most of the pre service teachers use the internet primarily as the information source. They also use the strategies of information searching and commitment as a combined way. (Gecer, 2014; Sirakaya and Cakir, 2014).

When students do the research to find out the information they need, they use the search engines, web scanners, e-books, e-magazines, e-newspapers, data bases and online library catalogues. The internet use of students to do the tasks, assignments given by their teachers, is becoming more and more common as the only and basic way of reaching information. (Jean -Francois 2003; Kuechler 1999; Mc Dowell 2002).

The findings in the research performed by Kurulgan and Argan (2007) illustrate that university students consider the internet as an important source of searching information. There are numerous sources of information on any topic on the internet. The full text of materials is easily reached with the help of time and place flexibility of the internet. In these environments there are a lot of different sources of different qualities prepared by different people because anybody can form a web page. There are questionable and misleading ones as well as excellent ones. However, it is important to determine whether this information in the electronic environment is accurate and reliable or not. The information in the printed materials such as books or newspapers is carefully examined, written and assessed by field experts, on the contrary, the information on the internet is prepared by professionals and/or non-professionals and it is not carefully examined unlike the information in the printed materials. That's why; the accuracy of the information on the internet has to be checked by the internet user. (Brandth, 1996).

When considered the incredible variety and immensity of the information on the internet, the internet user has to carefully interpret the information he gets from the internet. Otherwise, he takes the risk of getting inaccurate, missing, unreliable, subjective, biased and out of date information. That's why; the internet user has to have several strategies for information searching as there are numerous sources of information in web environment. And as a result of this, students have to be well educated about searching and finding information whenever they need. According to Brandth (1996); Flanagin and Metzger (2000), students can rely on the information they obtain from the internet without checking whether the information is accurate, prejudiced or biased. In the research on university students done by Debowski in 2001, it was agreed that students, who were inexperienced to do a research, made great efforts to find information on the internet. However, they were observed not to develop effective

searching strategies. At the end of the study, it was emphasised that necessary information concerning this issue ought to be put in education programmes for the students to be able to develop effective strategies.

It was stated in The Certificate of Strategies for Lifelong Learning (ME, 2009) that the expression used to define 'an educated person' who is literate and has arithmetical skills, changed in this century. Today, in the information era, 'an educated person' means someone who can follow the changes about himself; query and put them into action in his real life, who welcomes improvements, and who can use the communication technologies actively. It is obvious that the skill of evaluating the information in a critical way has become a very important skill in this era. According to Asami (2005), an internet user or researcher ought to have some basic skills to pick out the necessary information inside this immense information repository. It has to be admitted that there are several factors that affect information-searching strategies of every individual. Moon, in his research (2004), emphasises that if the individual has a higher level of internet information, he will develop better behaviours for a more conscious information searching. Students use different searching strategies so as to guide their searching behaviours. Because these strategies affect students' performances and their tasks, too. There has been some research to examine information searching strategies in recent years. According to the results of the research done by Akgun (2013), it was observed that in the environment where the education is combined with technology, the more the students use the internet, the more web pedagogic content information they have. In addition, it was also observed that there is a significant difference between the web pedagogic content information and the perception of teachers' self-efficacy. Therefore, pre service teachers have to be well-trained about the web, technology, pedagogy, and content information. Besides this, research has shown that most of pre service teachers prefer the internet as an information source primarily. The Students also use the combined information strategies so as to interpret the information. (Gecer, 2014; Sarikaya and Cakir, 2014).

However, the nature of information searching strategies in web environment has not been exactly defined yet. (Hill 1999; Beaufills 2000; Tsai and Tsai 2003; Wu and Tsai 2005). Ellis (1989) defines the behaviours that can be faced while information searching as follows: the beginning, making connections, reviewing, finding the difference, tracking, removing, justifying, and desistencing. (Jarvelin and Wilson, 2003). Wu and Tsai (2005) stated that students use two strategies when they are searching necessary information and sources on the internet. First of them is searching the information and the second is interpreting this information. Students use different searching strategies during information searching period. They evaluate the information they get on the internet whether it is accurate and appropriate or not. (Wu and Tsai, 2005). Yet, most students that are searching information on the internet fail to filter the information. That's why, they evaluate the information itself. (Brandth 1996). They do not bother themselves to question the information from different sources whether it is accurate or not, and to determine the quality of these sources. As a result of this, the information that comes from the internet might sometimes be misleading, biased or wrong. (Brandt 1996; Flanagin and Metzger, 2000). The feature of the internet site is one of the most important factors that affect students' strategies of searching information on the internet. The fact that the web site is more detailed and more useful, accurate and reliable, current and contemporary can affect the user to apply this site more than others and stay on this site longer. (Moon, 2004). In addition, if the site is well-designed, fast to be opened, and easy to be used as technical features, it will be more preferable. There are several researches to be done to evaluate the information from the internet. (i.e Brandth 1996; Flanagin and Metzger,2000). In the research performed by Askar and Mazman( 2013), the inventory consisting of 25 articles and 7 factors, which was prepared to determine the individuals' strategies of online information searching on the internet, was designed in Turkish to check its validity and reliability. It was stated that this inventory could especially be used to determine the strategies of online information searching done by individuals in web based learning environment at the level of high school and over. Few of these researches are about the effectuality and usefulness of these materials in web environment. That's why; students need researches in which the opinions on this issue are examined, too.

In today's world, where it is getting more and more common to use web based education, it is highly important which information searching strategies students in web based education environment

use and how they get the information they need and how they evaluate and interpret this information. However, there are not many researches in which we can see information searching strategies of students in web-based education environment. In few researches about this topic, only demographic features were studied.

Seeing that there is a need in this issue, this research was performed to examine what strategies university students use while searching information in web environment and interpreting the information; whether these strategies differ according to the students' demographic features or not. This research is considered to be useful to determine the tendency of university students in our country.

***The Purpose***

The purpose of this research is to determine the strategies of info-searching and interpreting this information and whether these strategies differ according to the students' demographic features or not.

And sub goals of this research are as follows;

1. What level strategies do university students have for information searching in web environment and interpret this information?
2. Do the strategies of university students differ according to their faculties, grades, gender, the frequency and the level of daily internet use while they searching the information in web environment?

## Method

***The model of the research***

In this research, scanning model was used because the environment and the circumstances are not going to change or be affected in any way. According to Buyukozturk (2009), the biggest advantage of the scanning model is that it gives us as much information as possible because the sampling consists of a lot of individuals.

***Sampling***

The universe of this research consists of university students at Kocaeli University. Sampling was taken from the universe, and easy-to-reach sampling method was used. These students are at Education Faculty, Science and Literature Faculty and Engineering Faculty of Kocaeli University. Totally 370 students that are at their first and fourth grades in the fall term of 2012/2013 academic year were included in this research. First and fourth graders were especially chosen for the research so that the researcher could observe whether the strategies of information searching in web environment change at the beginning and at the end of university education or not.

Table 1 illustrates the findings concerning the demographic features of the students in the research.

**Table 1.** The Findings Concerning the Demographic Features of the Students

| **Faculty** | **n** | **%** |
|---|---|---|
| Education | 124 | 33.5 |
| Science-Literature | 123 | 33.2 |
| Engineering | 123 | 33.2 |
| **Grades** | **n** | **%** |
| 1st grades | 191 | 51.6 |
| 4th grades | 179 | 48.4 |
| **Gender** | **n** | **%** |
| Females | 231 | 62.4 |
| Males | 139 | 37.6 |
| **Frequency of (Daily) internet use** | **n** | **%** |
| Less than 1 hour | 55 | 14.9 |
| 1 hour | 65 | 17.6 |
| 2 hours | 92 | 24.9 |
| 3 hours | 64 | 17.3 |
| 4 hours and over | 94 | 25.4 |
| **The level of internet use** | **n** | **%** |
| Starter | 19 | 5.1 |
| Intermediate | 225 | 60.8 |
| Advanced | 126 | 34.1 |

When Table 1 is examined, it is observed that % 33.5 of the students is studying at Education Faculty and the other % 33.2 of them is students at Science and Literature Faculty and Engineering Faculty. The rate of first graders is % 51.6 and fourth graders rate is %48.4. In addition, % 62.4 of the students is females, and % 37.6 of them is males. As for the frequency of daily internet use; % 14.9 of the students state that they stay online less than one hour a day. However, % 25.4 of them says that they stay online for more than four hours a day. % 5.1 of them is at the starter level, % 60.8 of them is at the intermediate level, and % 34.1 of them is at the advanced level of internet use. As seen in Table 1, even though the faculties and classes of the participants are homogenous, the majority of the group in the research consists of females. Almost all of the participants (% 95) can use the internet at the immediate level, and most of them (% 67) say that they use the internet minimum two hours and over.

***Data Collecting Tool***

The 'questionnaire of the strategies for searching and interpreting information in web environment' was used in this research and it was developed by Wu and Tsai in 2005. It was also tested to justify the factor analysis and the coherency for the task. (Wu and Tsai, 2005). The questionnaire consists of 24 articles and 6 sub factors. The reliability and validity of the original -form scale was checked on 610 university students in Taiwan, 395 of whom were undergraduate students and 215 of whom were post graduate students. In the justifying factor analysis done by Wu and Tsai , each ***t*** value of 24 articles was significant in 6 sub factors at the level of 0,05. The fit indices of the questionnaire were x2/sd=3,34 RMSEA=0.064, GFI=0.90, CFI=0.96, NFI=0.95, NNFI=0.96. These values were defined to justify the structure. For the whole questionnaire, Cronbach alfa internal consistency parameter was calculated as 0.82, factors, in order, 0.74,0.82,0.89,0,77,0.86, and 0.71.

After the necessary permission to do the adaptation was taken by e-mail from Wu and Tsai, who developed the questionnaire, the adaptation studies were started. And this adaptation study of the questionnaire was performed with 676 university students at Kocaeli University during 211-2012 Academic year.

The process for the adaptation studies for Turkey can be examined in two parts. The First part includes the period in which the questionnaire was translated into Turkish, the expert opinions were applied, Turkish and English versions were filled in by bilingual English teachers at different times. The second part is the period in which the questionnaire was performed to 676 university students so as to analyze its reliability and validity. The language validity was done with retranslation method. In this method, the questionnaire is translated from the original language (the source) into the target language that is going to be used. Later on, the source is translated into the source language back by interpreters or experts who know both languages very well. This translation is compared to the statements in the questionnaire, and if there are any inconsistencies, necessary corrections or changes are made. (Savasir, 1994). The translation application should be done as a translation from one language into another and then re-translate into the original language. While choosing the interpreter, the ones who can fluently speak in both languages, are familiar with both cultures, and have information about the test and test groups to some extent, should be taken into consideration. (Deniz, 2007). This questionnaire was translated into Turkish by four very good interpreters and then the Turkish version, which was re-translated into the original language by two experts, was compared to see whether there were any changes and inconsistencies or not. Naturally, necessary changes and corrections were made to get the consistence. After this period of reaching the consistency of the questionnaire, expert opinions were taken to adapt it to the universities in Turkey and necessary corrections were made again. To do this, some academicians who work in the fields of English teaching (4),Turkish teaching (1), Computer and Information technologies teaching (2), Computer teaching (2) and Testing and Evaluating (1) were consulted. In the form prepared to get the expert opinions, there were two parts for each article: *Appropriate/Inappropriate*; and the experts were requested to mark the correct one. Their opinions were evaluated in two groups as the language and the field. The questionnaire was converted into a Turkish questionnaire consisting of 24 articles and 6 dimensions after having done the content and validity check. The names of the sub dimensions in the questionnaire were re-named with the help of expert opinions thinking that the original names could fail to give the real meaning when translated into Turkish. The name of the first factor in the questionnaire is 'searching information in different sites' including the accuracy of the information in web based education environment. (The third article under this factor was eliminated during the adaptation studies.) This factor consists of two articles. The name of the second factor in the questionnaire is searching information in 'official and professional sites' including the information about the strategies for info-searching in web based education environment. There are four more factors under this article. The name of the third factor in the questionnaire is 'the consistency of the content with the purpose' including the information about the effectuality for the purpose.

This factor consists of 5 articles. The name of the fourth factor in the questionnaire is 'technical features and visuality' including the information about the effectuality. This factor consists of 4 articles. The name of the fifth factor in the questionnaire is 'organizing the information' including the strategies of information searching in web based education environment. This article consists of 5 factors. The name of the sixth factor in the questionnaire is 'the internet use of one source' including the strategies for information searching. This factor consists of 3 articles; 'searching different sources' , 'the consistency of the content with the purpose' and 'organizing the information'. Wu and Tsai (2005) called these three factors 'advanced information searching strategies, thinking that students make big efforts to reach the accurate and effective information. They also named other three factors, which are, 'searching in official and professional sites' 'technical features and visuality' and ' the internet use of one source' as 'simple information searching strategies, because they thought that students do not make much effort to reach the information. The statements in the questionnaire were observed to have been evaluated as the linkert model, 6. 'I absolutely disagree' (1) , and 'I absolutely agree' (6) . The final version of the

questionnaire, however, was evaluated as linkert 5. (Hseih & Tsai,2011). The questionnaire was applied as the linkert 5, in adaptation period into our culture.

The findings concerning exploratory factor analysis; the exploratory factor analysis was performed with the 24 articles in the questionnaire. In order to do this analysis, first of all, Kaiser-Meyer-Olkin ( KMO) test was taken as the sampling. The KMO value was calculated as .778. Because this value was higher than 70, it was concluded that the factor analysis could be made on these data. Secondly, Bartlett' Sphericity test was taken and (×2=3244.491, p=.000) the data was found to be suitable for an analysis. The results of KMO and Bartlett test were given at Table 1.

The principal component analysis and Varimax rotation were made so as to determine the validity of the questionnaire. (Gulbahar and Buyukozturk, 2008; Usluel and Vural , 2009). Varimax can be said to be more suitable when there is a multi-factor structure. ( Buyukozturk,2002). At the end of the exploratory factor analysis, a six-factor structure was obtained, explaining % 53,80 of the total variance and the Eigen value was over 1,00. Table 2 illustrates the results of the factor analysis and the rates of variance and Eigen values.

**Table 2.** The Eigen Value and announced Variance Rates of the factors in the Factor Analysis

| Factors | Eigenvalue | Announced Variance | Total Varience |
|---|---|---|---|
| 1 | 17,347 | 11,553 | 11,553 |
| 2 | 11,360 | 10,602 | 22,155 |
| 3 | 7,877 | 9,473 | 31,628 |
| 4 | 6,269 | 8,857 | 40,485 |
| 5 | 5,861 | 7,444 | 47,929 |
| 6 | 5,094 | 5,879 | 53,808 |

At the end of Varimax rotation, one of the articles (article 3) was taken out of the questionnaire because its factor burden value and other burden value were lower than ,40. After taking out this article, the rotation was done again. Similar statistical techniques of analysis and similar applications were used in the studies of the questionnaire adaptation done by Gulbahar and Buyukozturk (2008), Usluel and Vural ( 2009), Kilicer and Odabasi (2010). The essential criteria consist of burden value in the evaluation of the factor analysis results. The factor burdens of the articles in the questionnaire range from .544 and 7.99.

Table 3 illustrates the total correlation of the articles and factor burdens of the strategies of information searching in web environment.

**Table 3.** The Results of the Exploratory Factor Analysis of the Questionnaire for Information Searching and Commitment Strategies of University Students in Web Environment

| Article | Factor Burden Value | | | | | | Total Correlation of Articles |
|---|---|---|---|---|---|---|---|
| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 | Factor 6 | |
| m1 | .785 | | | | | | .752 |
| m2 | .781 | | | | | | .757 |
| m4 | | .692 | | | | | .743 |
| m5 | | .722 | | | | | .749 |
| m6 | | .754 | | | | | .741 |
| m7 | | .709 | | | | | .736 |
| m8 | | | .604 | | | | .738 |
| m9 | | | .584 | | | | .736 |
| m10 | | | .663 | | | | .739 |
| m11 | | | .739 | | | | .736 |
| m12 | | | .690 | | | | .736 |
| m13 | | | .544 | | | | .737 |
| m14 | | | | .736 | | | .737 |
| m15 | | | | .799 | | | .744 |
| m16 | | | | .749 | | | .746 |
| m17 | | | | | .549 | | .748 |
| m18 | | | | | .667 | | .743 |
| m19 | | | | | .735 | | .744 |
| m20 | | | | | .630 | | .743 |
| m21 | | | | | .706 | | .746 |
| m22 | | | | | | .674 | .748 |
| m23 | | | | | | .703 | .752 |
| m24 | | | | | | .735 | .751 |
| α | 0,47 | 0.71 | 0.73 | 0.70 | 0.70 | 0.58 | |
| Announced Variance | 11,55 | 10,60 | 9,47 | 8,85 | 7,44 | 5,87 | |
| Total Announced Variance: %53.80 | | | | | | | |

At the end of the factor analysis, 6-factor structure, whose Eigen value was over 1,00, was obtained explaining the total value of the variance as %53,80. One factor (3) in the questionnaire was eliminated because its factor burden value was under .40, and the analysis of the questionnaire was revised with 23 articles. The factor burdens of the articles in the questionnaire range from ''.544'' and ''.799''. The parameter of Alpha internal consistency for the scores acquired from the sub factor 'Searching different sources' was calculated as ⌾=.47. The parameter of Alpha internal consistency for the scores acquired from the sub factor 'Searching in official and professional sites' was ⌾=.71. The parameter of Alpha internal consistency for the scores acquired from the sub factor 'The consistency of the content' was ⌾=.73 for the sub factor. The parameter of Alpha internal consistency for the scores acquired from the sub factor 'Technical features and visuality.' was found ⌾=.70. The same rate, ⌾=.70, was found for the parameter of Alpha internal consistency for the scores acquired from the sub factor 'Organizing the information'. The parameter of Alpha internal consistency for the scores acquired from the sub factor 'The internet use of one source' was calculated ⌾=.58. The fact that some parameters were found lower in some sub factors can be explained that there were few articles in the sub dimension. (Ebel,1972). The parameter of Alpha internal consistency for the scores acquired from all of the sub factors was ⌾=.75. The gap width of the questionnaire was formulated with line width/the number of the groups. (Tekin,1996). In the evaluation of the findings from this research; the gap of arithmetical

average were like this: '1,00-1,80' = 'I absolutely disagree'. '1,81-2,60'= I do not agree'. 22,61-3,40' = 'I partly agree'. '3,41-4,20' = ' I absolutely agree.'

The findings concerning confirmatory factor analysis (CFA): The adaptation studies of the questionnaire were done in the fall term of 2011-2012 academic years with 676 university students at Kocaeli University. The questionnaire consisting of 23 articles and 6 factors was tested with CFA. The findings concerning this analysis were illustrated in Table 4.

**Table 4.** The values concerning the information searching strategies on the internet (Goodness-Of-Fit Indices)

| Chi-square | DF | P-Value | CFI | NNFI | AGFI | GFI | SRMR | RMSEA | 90% C.IRMSEA |
|---|---|---|---|---|---|---|---|---|---|
| 497,82 | 212 | 0.000 | 0.90 | 0.89 | 0.92 | 0.94 | 0.049 | 0.045 | 0.040;0.050 |

According to the findings from the fit indices acquired in the confirmatory factor analysis of the questionnaire, the fit between the model and data is high. The fact that finding, x2 /sd=2,34 is lower than 3 shows the perfect fit. (Kline,2005;Sumer,2000). When RMSEA is examined, it is seen that there is 0.045 fit. When the RMSEA values are lower than .05, it means perfect fit and .08 means good fit. (Hair, Anderson, Babin, Black and Tahtam,2006; Kline,2000; Schumacker and Lomax,2004; Tabacnick and Fidel, 2007). GFI and AGFI indices are observed to be .94 and .92. If GFI and AGFI indices are over .90, it is good fit. CFI as calculated as 0.90. If CFI is over.90, it means good fit. (Schermelleh-Engel and Moosbrugger, 2003; Sumer,2000). Additionally, the values of CFI, NFI, AGFI is over 0.80 so it can be said that there is a good fit in model-data. (Duyan and Gelbal,2008).The value of SRMR, which gives the model fit concerning standard errors, is lower than 0.08 (HU and Bentler,1999) .This also means that there is a good fit between the model and the data. When all the values concerning model-data fit are taken into consideration, it is found that the model fits with the data perfectly. Therefore, the questionnaire can be said to have structural validity. Thus, the articles in the questionnaire can measure the strategies of information searching in web based education environment. Because the sub factors in the original form of the questionnaire were studied separately, the evaluation in this research was done not on the total scores but the scores of the sub factors.

***Analysis of Data***

SPSS programme 17.0 was used in the data analysis, and the level of significance was accepted as .05 in the evaluation of the results. In the research, descriptive statistics such as, (f) for the frequency, (%) for the percentage, and (x) for the arithmetical average were used. T test, Anova test, and LSD test were applied in this research.

## Findings

In this part, the data was analysed and interpreted in accordance with the purpose and sub goals of the research. It was supported with other researches on this issue.

### *The strategies of university students for searching and interpreting information in web environment*

The findings concerning the strategies of university students for searching and interpreting information in web environment are illustrated in Table 5:

**Table 5.** The Findings Concerning the Strategies of University Students for Searching and Interpreting Information in Web Environment

| **The strategies of information searching on the internet** | **n** | $\bar{X}$ | **sd** |
|---|---|---|---|
| ***When I see some information about the topic I search;*** | | | |
| 1. I decide whether it is accurate or not only after I discuss it with my teachers or friends. | | 3.71 | .98 |
| 2. First of all, I look for the information in books (or printed materials) and then I evaluate the accuracy of the information. | | 4.03 | .87 |
| 3. I believe the accuracy of the information only if it is broadcast in a well-known site. | | 3.79 | .99 |
| 4. I believe in the accuracy and reliability of the information if it is broadcast in official web sites (such as the government or education institutes). | | 4.11 | .93 |
| 5. I believe the accuracy of the information if it is broadcast in a professional web site. | | 3.68 | .87 |
| 6. I believe the accuracy of the information if it is broadcast in a web site recommended by experts. | | 3.84 | .91 |
| ***While I examine the information on the internet;*** | | | |
| 7. I think the information is beneficial for me if the content of the information is suitable for my purpose. | | 4.09 | .71 |
| 8. I think the information is beneficial for me if I am directed into more links about the information. | | 3.37 | 1.05 |
| 9. I think the information is beneficial for me if it gives me more alternatives to do the research | | 3.84 | .86 |
| 10. The more appropriate it is for my purpose, the more I believe the information. | | 3.87 | .87 |
| 11. The higher level the information about my research topic is, the more beneficial it is for me. | 370 | 4.10 | .79 |
| 12. I find the information more useful if it is presented with some animations or visual materials. | | 3.72 | 1.06 |
| 13. If the information does not take me more time to reach, it is more useful for me. | | 2.83 | 1.16 |
| 14. If the information does not require a password or registration; I think the information is useful for me. | | 2.66 | 1.03 |
| ***When I need to search information on the internet,*** | | | |
| 15. If the information is in an elaborate web site, I believe the information is beneficial for me. | | 2.36 | .97 |
| 16. I am generally used to summarising the information I reach. | | 3.76 | .91 |
| 17. I can find the most appropriate information using my background information in advanced search options. | | 3.88 | .78 |
| 18. I can combine the information that I get from different web sites. | | 4.21 | .63 |
| 19. I frequently remind myself of my purpose of the search. | | 3.90 | .86 |
| 20. I compare different information in web pages or we sites. | | 4.17 | .73 |
| 21. I usually prefer one search engine to find the best web sites or pages. | | 3.38 | 1.23 |
| 22. If I find the web site related to my topic, I do not search for others. | | 2.30 | 1.12 |
| 23. I would like to have only one web site including the most suitable information for my purpose. | | 2.84 | 1.32 |

When Table 5 is examined, it is observed that the highest rate concerning the strategies of information searching in web environment goes to the 18th article, which is the statement 'I can combine the information that I get from different sites'. (±=4.21). The students marked

'I absolutely agree' column. They stated that they agreed with 1,2,3,4,5,6,79,10,1216,17,19 and 20th article. However, they said they did not agree with the 15th and 22nd articles.

**Table 6.** The Sub Findings Concerning the Strategies of Searching and Interpreting Information in Web Environment

| The strategies of searching and interpreting information in web environment | n | $\bar{x}$ | sd |
|---|---|---|---|
| 1st factor: searching different sources | 370 | 3.87 | 0.74 |
| 2nd factor: searching in official and professional sites sitelerden sorgulama | | 3.86 | 0.68 |
| 3rd factor: the consistency of the content | | 3.86 | 0.57 |
| 4th factor: technical features and visuality | | 2.89 | 0.76 |
| 5th factor: organising the information | | 3.98 | 0.49 |
| 6th factor: the internet use of one source | | 2.84 | 0.90 |

When table 6 is examined, it is observed that factor 5 'Organizing the information' has the highest rate (×=3.98) . In the order of the highest to the lowest; Factor 1 'Searching from different sites' comes next.( ×=3,87). Factor 2 'Searching in official and professional websites' is in the third place with the rate of (×=3,87). Factor 3, 'The consistency of the content with the purpose' comes fourth with the rate of (×= 3, 86. ) . The students stated that they agreed with the articles in this category. The students were observed to agree with the factors 4 and 6 to some extent. The rates of these two factors are (×=, 89) 'Technical features and visuality' and then factor 6, (×=2,83) ' The internet use of one source' is the lowest one.

***The findings concerning the information searching strategies of the university students in web environment according to their faculties, grades, gender, the frequency of daily internet use and the level of their internet use***

The findings concerning the information searching strategies of the university students in web environment according to their faculties, grades, gender, and the frequency of daily internet use are illustrated in Table 7.

**Table 7.** The Findings Concerning the Information Searching Strategies of the University Students in Web Environment according to Their Faculties, Grades, Gender, and the Frequency of Daily Internet Use

| The questionnaire of info-searching and commitment strategies in web environment | Faculty | $\bar{x}$ | Sd | F | *p* | Difference in intergroups | $\eta^2$ |
|---|---|---|---|---|---|---|---|
| Searching different sources | Education(1) | 3.77 | 1.42 | 11.10 | .000*** | 1-2 2-3 | 0.057 |
| | Sci&Lit (2) | 4.12 | 1.23 | | | | |
| | Engineering (3) | 3.72 | 1.65 | | | | |
| Searching official and professional sites | Education | 3.89 | 2.52 | 5.07 | .007** | 1-2 2-3 | 0.029 |
| | Sci&Lit | 3.70 | 2.96 | | | | |
| | Engineering | 3.94 | 2.65 | | | | |
| The consistency of the content | Education | 3.76 | 2.82 | 3.87 | .022* | 1-3 | 0.021 |
| | Sci&Lit | 3.84 | 3.11 | | | | |
| | Engineering | 3.96 | 2.67 | | | | |
| Technical features and Visuality | Education | 2.83 | 3.12 | 3.83 | .022* | 1-3 2-3 | 0.021 |
| | Sci&Lit | 2.80 | 3.09 | | | | |
| | Engineering | 3.05 | 2.92 | | | | |
| Organizing the information | Education | 4.00 | 2.23 | 0.30 | .737 | | 0.005 |
| | Sci&Lit | 3.95 | 2.63 | | | | |
| | Engineering | 4.00 | 2.48 | | | | |
| The internet use of one source | Education | 2.89 | 2.66 | 2.40 | .091 | | 0.015 |
| | Sci&Lit | 2.70 | 2.54 | | | | |
| | Engineering | 2.93 | 2.86 | | | | |

* $p<.05$, ** $p<.01$, *** $p<.001$

According to Table 7, there is a significant difference between the strategies of information searching in web environment and the faculties of the students. [ F ( 2-367)= 11.10 ; p<0.001]. The arithmetical average of the factor 'searching in different web sites' for the students at Science and Literature Faculty is much higher than the average of the students at Education and Engineering Faculties. According to LSD comparison test, there is a significant difference between the students at Education faculty and Science and Literature faculty and also between the students at Science and Literature faculty and Engineering faculty. It is considered that because the students at Science and Literature faculty have science lessons for scientific research, the result of the test is not very surprising.

Another significant difference [F (2-367)=5.07;p<0.01] was found between the students` faculties and their information searching strategies in web environment when it came to the sub factor, 'Searching in official and professional sites' The arithmetical average of the students at Engineering faculty is higher than the students at Science and Literature faculty about the information searching strategies, sub factor 'Searching information in official and professional sites'. According to LSD comparison test, the difference was specially found between the students at Education faculty and Science and Literature faculty ; and Science and Literature faculty and Engineering faculty. The researcher found another significant difference, about the university students` strategies for information searching in web environment, between their university and sub factor 'The consistency of the web site with the purpose'. [ F (2_367)= 3,87; p<0.05]. The arithmetical average for the students at Engineering faculty was higher than the students at other two universities. According to LSD comparison test, the difference was significant especially between the students at Education faculty and Engineering faculty.

As for the sub factor 'Technical features of the web site and visuality', a significant difference too, was calculated between the students` strategies and their faculties. [ F ( 2-367)= 3.83; p<0.05]. This difference was observed between the arithmetical average of the students at Engineering faculty and the students at Science and Literature. According to LSD comparison test, the results were different especially for the students at Education faculty and Engineering faculty; also the students at Science and Literature faculty and Engineering faculty. However, no significant difference was found between the students' faculties and other two factors, 'Organizing the information' and 'The internet use of one source'. When the size of the effect was examined, all the sub factors were observed to be lower.

**Table 8.** The Findings Concerning the Information Searching Strategies of the University Students in Web Environment according to Their Grades

| **The questionnaire of info-searching and commitment strategies in web environment** | **Grade** | $\bar{X}$ | **Sd** | **t** | ***p*** | **η²** |
|---|---|---|---|---|---|---|
| Searching different sources | 1st grade | 3.99 | 1.28 | 3.14 | .002** | 0.026 |
| | 4th grade | 3.75 | 1.64 | | | |
| Searching official and professional sites | 1st grade | 3.77 | 2.80 | 2.42 | .016* | 0.015 |
| | 4th grade | 3.94 | 2.65 | | | |
| The consistency of the content | 1st grade | 3.88 | 2.93 | .743 | .458 | 0.001 |
| | 4th grade | 3.83 | 2.86 | | | |
| Technical features and Visuality | 1st grade | 2.94 | 3.04 | 1.160 | .244 | 0.003 |
| | 4th grade | 2.85 | 3.09 | | | |
| Organizing the information | 1st grade | 4.00 | 2.37 | .630 | .529 | 0,001 |
| | 4th grade | 3.97 | 2.53 | | | |
| The int. use one of source | 1st grade | 2.86 | 2.61 | .453 | .651 | 0.000 |
| | 4th grade | 2.82 | 2.80 | | | |

* *p*<.05, ** *p*<.01

Independent ***t*** test was applied in order to determine whether the strategies of searching information in web environment differentiate according to the students` grades or not. Apart from the

sub factor 'Searching different sources', and 'Searching in official and professional sites'; no significant difference was found in other factors. The difference between the strategies and the grades of the students was significant when the factor is 'Searching different sources' [ t (368)=3.14;p<.01]. The arithmetical average of 1st graders is much higher than the 4th graders about the strategies sub factor, 'Searching different sources'. Another significant difference was found in the sub factor,' Searching in official and professional sites'. This time, the arithmetical average of 4th graders was higher than the 1st graders about the sub factor, 'Searching in official and professional sites'. When the size of effect was examined, all the sub factors were observed to be very low.

**Table 9.** The Findings Concerning the Information Searching Strategies of the University Students in Web Environment according to Gender

| **The questionnaire of info-searching and commitment strategies in web environment** | **Gender** | **n** | $\bar{X}$ | **sd** | **t** | ***p*** | **η²** |
|---|---|---|---|---|---|---|---|
| Searching different sources | Female | 231 | 3.87 | 1.44 | .103 | .918 | 0.000 |
| | Male | 139 | 3.87 | 1.56 | | | |
| Searching official and professional sites | Female | 231 | 3.90 | 2.62 | 1.469 | .143 | 0.005 |
| | Male | 139 | 3.79 | 2.93 | | | |
| The consistency of the content | Female | 231 | 3.81 | 2.95 | 1.944 | .053 | 0.010 |
| | Male | 139 | 3.93 | 2.76 | | | |
| Technical features and visuality | Female | 231 | 2.82 | 3.04 | 2.298 | .022* | 0.014 |
| | Male | 139 | 3.01 | 3.07 | | | |
| Organising the information | Female | 231 | 4.01 | 2.34 | 1.242 | .215 | 0.004 |
| | Male | 139 | 3.94 | 2.61 | | | |
| The internet use of one source | Female | 231 | 2.77 | 2.59 | 1.977 | .049* | 0.010 |
| | Male | 139 | 2.96 | 2.84 | | | |

* $p<.05$

***t - test*** was applied in order to determine whether the strategies of searching information in web environment differentiate according to the gender of the students. There was a significant difference between the gender of the students and three sub factors, which are 'The consistency of the content' 'Technical features and visuality' 'The internet use of one source' ; the difference between the gender and 'The consistency of the content' was calculated as [t (368)=2.298;p<.05]. This means that the arithmetical average of males is much higher than females when it comes to the consistency of the content. The arithmetical average of males is higher than females about the technical features and visuality, too , as it was calculated as [ t (368)=1.977;p<.05]. The other remarkable difference was found in the sub factor 'The internet use of one source' [ t ( 368)=1.977; p<.05]. Again, the arithmetical average of males was higher than females about this factor. However, no significant difference was found between the gender of the students and the other sub factors. When the size of the effect was examined, all the sub factors were observed to be very low.

**Table 10.** The Findings Concerning the Information Searching Strategies of the University Students in Web Environment according to the Frequency of Daily Internet Use

| **The frequency of daily internet use** | **Less than 1 hour (n=55)** $\bar{x}$ | **1 hour (n=65)** $\bar{x}$ | **2 hour (n=92)** $\bar{x}$ | **3 hour (n=64)** $\bar{x}$ | **4 hours and over (n=94)** $\bar{x}$ | **F** | ***p*** | **$\eta^2$** |
|---|---|---|---|---|---|---|---|---|
| Searching different sources | 3.89 | 3.94 | 3.89 | 3.69 | 3.92 | 1.207 | .307 | 0.015 |
| Searching official and professional sites | 3.68 | 3.90 | 3.88 | 3.91 | 3.86 | 1.153 | .332 | 0.017 |
| The consistency of the content | 3.84 | 3.72 | 3.82 | 3.95 | 3.94 | 1.868 | .115 | 0.020 |
| Technical features and visuality | 2.82 | 2.87 | 2.91 | 3.01 | 2.86 | .591 | .669 | 0.006 |
| Organising the information | 3.88 | 3.96 | 3.94 | 4.02 | 4.08 | 1.991 | .095 | 0.021 |
| The internet use of one source | 2.81 | 2.81 | 2.90 | 2.98 | 2.72 | .538 | .442 | 0.015 |

Anova test was applied so as to observe whether the students ` strategies of information searching in web environment differ according to the frequency of daily internet use. However, no significant difference was found in sub factors. When the size of the effect was examined, all the sub factors were observed to be very low.

**Table 11**. The Findings Concerning the Information Searching Strategies of the University Students in Web Environment according to the Levels of the Students' Internet Use

| **The levels of the students' internet use:** | **Starter (n=19)** $\bar{x}$ | **Intermediate (n=225)** $\bar{x}$ | **Advanced (n=126)** $\bar{x}$ | **F** | ***p*** | **$\eta^2$** |
|---|---|---|---|---|---|---|
| Searching different sources | 3.94 | 3.87 | 3.86 | .100 | .905 | 0.000 |
| Searching official and professional sites | 3.88 | 3.81 | 3.93 | 1.300 | .274 | 0.007 |
| The consistency of the content | 3.73 | 3.81 | 3.96 | 3.233 | .041* | 0.017 |
| Technical features and visuality | 2.55 | 2.88 | 2.97 | 2.675 | .070 | 0.014 |
| Organising the information | 3.75 | 3.98 | 4.02 | 2.550 | .079 | 0.013 |
| The internet use of one source | 2.78 | 2.83 | 2.86 | .084 | .919 | 0.000 |

* $p<.05$

Anova test was performed to determine whether the students` strategies of information searching in web environment differ according to their level of internet use. In all of the factors, apart from the one 'The consistency of the content', no significant difference was found in other factors. However, a significant difference was found in the sub factor 'The consistency of the content' [F (2-367)=3.233; ; p<0.05]. The arithmetical average of the students at the advanced level of internet use was found higher than the students at the starter and intermediate level in the sub factor 'The consistency of the content'. According to LSD comparison test, the biggest difference was especially observed between the students at the advanced level and the students at the intermediate level. No significant difference was found in other sub factors. When the size of the effect was examined, all the sub factors were observed to be low.

## Discussion, Conclusion and Suggestions

### *Discussion*

Whether Searching and interpreting the information strategies in web environment of university students differ according to the faculties of the students( or not) was examined and it can be said that the students at Science and Literature faculty were more conscious than the students at other faculties in using the different sources to get information.

On the other hand, the students at Engineering faculty were observed to use official and professional sites more than the students at other faculties. They were also observed to be more sensitive about the technical features and visuality. When the findings about the faculty factors were examined as a whole, it can be agreed that the students at Science and Literature faculty are under the general average of all dimensions, except for the first and third dimensions. In addition, the average of this faculty is the lowest of the other two faculties. Engineering faculty is the highest in five dimensions, Education faculty is the highest in two dimensions, and Science and Literature faculty is the highest in one dimension. The fact that the students at Engineering faculty had five of the highest value out of six, can be explained with the fact that they were faster to get technological innovations because of their departments at the faculty. Similar findings can be found in the literature. In the research done by Wu and Tsai (2005) , according to the advanced and simple information searching strategies, students at Engineering faculty were observed to use simple and partly-advanced strategies more frequently than other students. It is advised to do other researches concerning this issue.

The students in their first year were observed to use the sub factor 'Searching different sources' more frequently than the students in their fourth year. On the contrary, the fourth graders were observed to rely on the official and professional sites more than the first graders, For instance, Wu and Tsai examined the strategies of the graduate and under graduate university students in 2007. They organized the research in three groups: in the first group, there were the students in their first and second years at university, the other group consisted of the students in their third and fourth years at university, and the graduate students were put in another group. At the end of the research, they found out that the graduate students had more scores than the students in other groups in the strategy of 'searching different sites'. In this research , it was also found that the first graders had the highest score in all the five sub dimensions and they use advanced strategies for searching information. However, the fourth graders had the highest score in only one sub dimension, and it was over the average. That's why; more researches are needed to be done on this issue. Male students were observed to use the strategies, 'The consistency of the content' 'The internet use of one source' 'Technical features and visuality ' more frequently than female students. This result proves that male students in the literature spend more time on the internet ( Balci, Golcuk and Ocalan,2013; Baran and Ata 2013), and their proficiency of internet use is much better than female students ( Baran and Ata 2013; Gunduz and Ozdinc 2008;Peng, Tsai and Wu 2006; Yapici, Hedevanli and Akbayin 2010; Yenilmez and et al, 2011). Similar findings can also be seen in the literature. This result matches up with the results achieved from the research done by Wu and Tsai (2007), Liang and Tsai (2009), Tsai and Tsai (2009) and Tsai and et al (2012). Thus, it can be concluded that there was a significant difference in the gender. In the research performed by Wu and Tsai (2007), the scores of the male students concerning 'The internet use of one source' were found higher than the scores of the female students. Likewise, a significant difference in the gender was recorded in the research performed by Liang and Tsai (2009), as well. In addition, the scores of the male students were recorded to be higher than the female students in the strategy of 'Searching different sources', 'Searching official and professional sites', 'Technical features and visuality' , and 'Organizing the information'. On the other hand, in the research done by Sarikaya and Cakir (2014), no significant difference was found between the gender and the strategies of searching and interpreting information in web environment. This contradiction about the gender can be explained with the difference in the features of the sampling, the type of the questionnaire used in the research and the way the variant was studied. The findings in this research do not illustrate a significant difference in the strategies ; 'Searching in official and professional sites, and 'Organizing the

information'. Yet, the average of female students is higher than the male students in the strategies above. This result ought to be questioned in different researches. On the condition that more research is carried out to question this difference between the gender and the information searching strategies in web environment, the generalization of these results will be more possible.

The students using the internet at the advanced level have higher scores in the strategy ''The consistency of the content' than the students using the internet at the starter and intermediate level. That's why, it can be said that the students using the internet at the advanced level consider content-purpose relation more than other students. In the research performed by Baran and Ata (2013), the students who own a computer with an internet connection use web 2.0 technologies more than the ones who do not. They are also far more skilled and more educated. Similarly, when their skills improve, the rate of using web 2.0 technologies improves, too.

***Conclusion***

In this research, it was aimed to determine whether the strategies of searching and interpreting information in web environment by university students differ according to demographic variants. When the findings are examined, it can be concluded that university students are using the strategy for unifying the information they get from the internet more frequently. University students can be said to have the ability to unify the information they get from the internet as they want to find the accurate and reliable information. Similar findings are found in the literature, too. In the research performed by Sarikaya and Cakir (2014), the pre service teachers had an intermediate level of evaluating and problem solving among the strategies of online information search. The pre service teachers can pick up the appropriate information amongst other information in web environment and they can compare it, they can also develop new methods according to the search results, they can produce solutions. However, it is understood in this research that these abilities of the pre service teachers ought to be improved.

In this research, it can be said that among information searching and interpreting strategies in web environment, 'Organizing the information' is frequently used, as well. The students who were included in the research performed by Wu and Tsai (2007) were also recorded to use the same strategy frequently. In this research, about this strategy 'Organizing the information'; students admit that they are used to summarizing the information they get in web environment. They also say that they can unify the new information they get with their back ground information, they can develop advanced strategies for information searching and they can achieve the most accurate information by using these advanced strategies. They often remind themselves their purposes in the process of searching information in web environment. They can compare the different information from different sites. In the research performed by Sarikaya and Cakir (2014), when the frequency of daily internet use was examined, it was observed that pre service teachers whose frequency of daily internet use was higher had better strategies for trial-and-error, problem solving and control strategies. In the research performed by Gecer ( 2014), it was concluded that the highest scored strategy by pre service teachers for strategies of searching information in web environment was ' Organizing the information'. With the help of the information achieved in this research, it can be expressed that students are conscious about searching information in web environment and university students hardly ever apply simple strategies for searching information in web environment.

***Suggestions***

In today's world, when we think that all students from primary school and university spend time on the internet intensively, this research should be applied to elementary and secondary school students, too, so as to determine their strategies. According to the findings, students should be given training in order to use 'advanced strategies for searching and interpreting information' more effectively. In addition, the strategies for information searching and interpreting in web environment by graduate and post graduate students should be compared by using a different sampling.

The results achieved about the gender, faculty and grades were different from the ones in the literature. Similar studies should be applied to different samplings and the results should be compared. Whether there is a connection between the academic career, critical thinking, academic self-efficacy and the strategies for searching information in web environment or not should be examined. An interview form can be prepared by taking the questionnaire prepared for the strategies as the principle and it can be used for university students. By doing this, the researcher can check which strategies are higher and which are lower at searching information in web environment.

## References


Akgun, F. (2013). Web Pedagogic Content Information of Pre service Teachers and the Teacher Perception about their Self Proficiency. *Trakya University the Journal of Education Faculty*, *3*(1), 48-58

Asemi, A. (2005). Information Searching Habits of Internet Users: A Case Study on the Medical Sciences University of Isfahan, Iran. *Webology*, *2*(1), 213-218. Retrieved on December 6, 2014, from http://www.webology.org/2005/v2n1/a10.html

Aşkar,P., & Mazman S. G. (2013). The Adaptation Study of the Inventory of Online Information Searching Strategies. *Education and Science*, *38*(168), 167-182

Balcı, Ş., Golcu A. A., & Ocalan E. M. (2013). The Patterns of Internet Use by University Students. *Selçuk Communication*, *7*(4), 5-22

Baran B., & Ata F. (2013).The Situation of the Use of Web 2.0 Technologies by University Students The Level of Their Skills, The Situation of Their Educational Benefits. *Education and Science*, *38*(168), 192-208

Beaufils, A. (2000) Tools and strategies for searching in hypermedia environments. *Journal of Computer Assisted Learning*, *16*, 114-124.

Brandt, D. S. (1996). Evaluating information on the Internet. *Computers in Libraries*, 16 (5), 44-46

Buyukozturk, S. (2009). *The Manual of Data Analysis for Social Sciences: Search Pattern for Statisitics, Applications and commitment (10th Edition)*. Ankara: Pegem Academy.

Buyukozturk, S. (2002). Factor Analysis: Essential Concepts and The Use in Scale Development. *Education Administration in Theory and Practice, Fall*(32), 470-483.

Chou, C., & Tsai, C. C. (2002). Developing Web-based curricula: Issues and challenges. *Journal of Curriculum Studies*, *34*, 623-636.

Debowski, S. (2001). Wrong way: Go back! An exploration of novice search behaviours while conducting an information search. *The Electronic Library*, *19*(6), 371-382.

Deniz, Z.K. (2007). The Adaptation of The Psychological. *Ankara University the Journal of Education Sciences Faculty*, *40*(1), 1-16

Duyan, V., & Gelbal S. (2008). Barnett the Adaptation Study of the Scale for Child Love. *Education and Science*, *33*(148), 40-48

Ebel, R. L. (1972). *Essentials of educational measurement*. New Jersey: Prentice-Hall.

Ellis, D. (1989). A behavioural approach to information retrieval design. *Journal of Documentation*, *46*(3), 318-338.

ErsunA., Koze B. Ş., Muslu, G., Beytut, D., Başbakkal Z., & Conk Z. (2012). The Study of the relationship between the social support system and the internet use by the students at the school of nursing. *Istanbul University Florence Nightingale the Journal of nursing*, *20*(2), 86-92

Flanagin, A. J., & Metzger, M. J. (2000). Perceptions of Internet information credibility. *Journalism and Mass Communication Quarterly*, *77*, 515-540.

Gecer, A. (2014) Examining the strategies of pre service teachers for information searching and commitment in web environment according to demographic variables. *Education Technology Hypothesis and Application*, *4*(2), 1-20

Gulbahar, Y., & Buyukozturk, S. (2008). The adaptation of the evaluation preference scale into Turkish. *Hacettepe University the Journal of Education Faculty*, *35*, 148-161

Gunduz, S., & Ozdinc, F. (2008). The internet self-proficiency second level of Elemantary School. *8th International Educational Technology Conference, 6-9 May 2008*, Turkey, Eskişehir: Anadolu University

Gunuç, S., Odabaşı, H. F., & Kuzu, A. (2013). The definition of the 21. Century students by Pre-service teachers: A Twitter Application. *Hypothesis in Education and Application*, *9*(4), 436-455

Hair, J., Anderson, R., Babin, B., Black, W., & Tahtam R. (2006). *Multi variety data analysis*. New Jersey, Prentice Hall

Järvelin, K., & Wilson, T. D. (2003). On conceptual models for information seeking and retrieval research. *Information Research*, 9(1).

Jean-Francois, R. (2003). What was I looking for? The influence of task specificity and prior knowledge on students' search strategies in hypertext. *Interacting with Computers*, *15*, 409-428.

Hill, J. R. (1999). A conceptual framework for understanding information seeking in open-ended Information systems. *Educational Technology Research& Development*, *47*, 5-27

Hsieh, H. Y., & Tsai, C. C. (2011). The relationships among science-related major students' information commitment, mental load and mental effort. *Proceedings of the 19th International Conference on Computers in Education. 28 November-2 December 2011.* Thailand: Chiang Mai

Kılıcer, K., & Odabası, H. F. (2010). The scale of individual innovation: The adaptation into Turkish the study of reliability and validity. *Hacettepe University the journal of Education Faculty*, *38*, 150-164.

Kline, R. B. (2000). *Principles and practice of structural equation modelling*. New York: The Guilford Press.

Kuechler, M. (1999). Using the Web in the Classroom. *Social Science Computer Review*, *17*, 144-161. Retrieved February 17, 2014 from http://rsw.sagepub.com/content/17/2/144

Kurulgan, M., & Argan, M. (2007). The behaviours of info-searching on the internet by students of Anadolu University. *Atatürk University, the journal of Social Sciences Institute*, *9*(1), 291-304.

Liang, J. C., & Tsai, C. C. (2009). The information commitments toward web information among Medical students in Taiwan. *Educational Technology and Society*, *12*(1), 162-172.

Ministry of Education. (2009). *The Certificate of Lifelong Learning Strategy*. Retrieved October 10, 2013 from http://mesbil.meb.gov.tr/genel/hayat boyu.dokuman.pdf

Moon, B. J. (2004). Consumer adoption of the internet as an information search and product purchase channel: some research hypotheses. *Int. J. Internet Marketing and Advertising*, *1*(1), 104-118

McDowell, L. (2002). Electronic information resources in undergraduate education: an exploratory study of opportunities for student learning and independence. *British Journal of Educational Technology*, *33*, 255-266.

Peng, H., Tsai, C. C., & Wu, Y. T. (2006). University students self-efficacy and their attitudes toward the Internet: the role of students perceptions of the Internet. *Educational Studies*, *32*(1), 73-86.

Relan, A., & Gillani, B. B. (1997). Web-based instruction and the traditional classroom: Similarities and differences. In B. H. Khan (Ed.), Web-based instruction (pp. 41-46). Englewood Cliffs, NJ: Educational Technology.

Schermelleh-Engel, K., & Moosbrugger, H. (2003). Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, *8*(2), 23-74.

Savasır, I. (1994).The problems in scale adaptation and some solutions, The journal of Turkish Phycology, *9*(33), 27-32.

Sırakaya, M. & Çakır, H. (2014).Determining the strategies of pre service teachers online info searching. *Ahi Evran University Kırşehir the journal of Education Faculty*, *15*(2), 191-206

Schumacker, R. E. & Lomax, R. G. (2004). *A beginner's guide to structural equation modelling*. New Jersey: Lawrence Erlbaum Associates Publishers.

Sumer, N. (2000). Models of structural equation: Principal Concepts and Sample applications. *The literature of Turkish Phycology*, *3*(6), 49-74.

Wu, Y. T., & Tsai, C. C. (2005). Information commitments: evaluative standard and information Searching strategies in web-based learning environments. *Journal of Computer Assisted Learning*, *21*, 374-385.

Wu, Y. T., & Tsai, C. C. (2007). Developing an information commitment survey for assessing students' Web information searching strategies and evaluative standards for web materials. *Educational Technology & Society*, *10*, 120-132.

Wu Y.T. &Tsai C. C. (2007). Developing the Information Commitment Survey for assessing college and graduate students' evaluative standards for Web information and their searching strategies in Web-based learning environments. *2005 World Conference on E-Learning in Corporate, Government*, Healthcare, & Higher Education. October 24-28. Canada: Vancouver.

Tabachnick, B. G., &Fidell L. S. (2007). *Using multivariate statistics*. USA: Pearson Education.

Tsai, C. C. (2001). A review and discussion of epistemological commitments, metacognition, and Critical thinking with suggestions on their enhancement in Internet-assisted chemistry classrooms. *Journal of Chemical Education*, *78*, 970-974.

Tsai, M. J., & Tsai C. C. (2003). Information searching strategies in web-based science learning: The role of Internet self-efficacy. *Innovations in Education and Teaching International*, *40*, 43-50.

Tsai, M. J., Liang, J. C., Hou, H. T., & Tsai, C. C. (2012). University students online information searching strategies in different search contexts. *Australasian Journal of Educational Technology*, *28*(5), 881-895.

Usluel, Y. K., & Vural, F. K. (2009). The adaptation study of the scale for cognitive absorption. *Ankara University the journal of Education Faculty*, *42*(2), 77-92.

Yapıcı,U., Hevedanlı, M., & Akbayın, H. (2010). The beliefs of self-efficacy on internet use by Biology Pre teachers for Elementary School (Dicle University sample). *IETC - International Educational Technology Conference, April 26-28*. Turkey: Istanbul. Proceedings Book, 237-241.

Yenilmez, K., Turgut, M., Anapa, P., & Ersoy, M. (2011). The beliefs of self-efficacy on internet use by Maths Pre teachers for Elementary School. *5th International Computer &Instructional Technologies Symposium, 22-24 September*, Turkey, Elazığ: Fırat University.