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High school students educational usage of Internet and their learning approaches*

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Abstract

This study examines the Internet usage of high school students for educational needs in respect to their learning approaches. The "learning approach" categorizes individuals as 'surface learners' and 'deep learners'. Surface learners mainly choose to rehearse and memorize the course material they work on and they acquire the information they need to learn in a disconnected way, by memorization. On the other hand, deep learners want to grasp the meaning of the course material. In the study, adapted Turkish version of Learning Process Questionnaire (LPQ) was used to determine high school students' learning approaches. 921 secondary school students were subjected and the Cronbach alpha values were 0.73 for a deep approach and 0.66 for a surface approach. According to the data obtained, surface learners use the Internet more when compared to deep learners, though they use it for non-instructional purposes. The ratios of the Internet use of deep learners for educational needs are higher when compared to those of surface learners. Ratios of the Internet use for educational needs by the students who are given assignments requiring the use of the Internet are higher.

Keywords: Internet use; learning approaches; deep learning; surface learning; high school students

1. INTRODUCTION

In the present age, information and communication technology (ICT) plays a central role in the development of modern economies and societies (The Organisation for Economic Co-operation and

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Development [OECD], 2006). Today's students integrate technology into all aspects of their lives for multiple purposes, particularly socializing, entertaining and shopping (Asselin & Moayeri, 2008) as well as doing homework by using the Internet (Lenhart, Madden & Hitlin, 2005). Consequently, in the education field, attention has turned to integrating technology into the curriculum (Wallace, 2004).

According to Todd (2008), students highly prefer to access and use information technology to help them with their school work. Moreover, Todd and Kuhlthau (2005) indicate that students see a clear relationship between being able to access information through information technology and their achievement in research assignments and projects**.** The results of the PISA 2005 survey concur with this view of students. According to the results of the PISA 2005 survey in OECD countries, on average, students with computers available for home use have a mean score in mathematics of 514 points, whereas those without access to computers at home the available score is only 453 points. In the same survey, Turkish students who do have a computer at home perform, on average, at Level 2 (appoximately 480 score points); those without a computer at home perform at Level 1, appoximately 415 score points (OECD, 2006).

Academic achievement depends on the ability to read, comprehend, and communicate at high levels (Holcomb, Castek, & Johnson, 2007). Nowadays, one of the main technologies used at schools for instructional needs is the Internet. Thus, there is a growing body of authoritative material avaliable on the Internet (Harmon, 2007) and, as a source of information, it can be used like books, library resources, or even field trips (Wallace, 2004). To benefit from the huge resources that exist on the Internet, students must necessarily have a high level of information literacy. Information literacy can be defined as 'knowing when and why you need information, where to find it and how to evaluate, use and communicate it in an ethical manner' (Gullbekk, Skagen, Tonning & Torras, 2009). As can be seen from the definiton, there is a shift in the information environment from finding, locating and evaluating information to one of using information, creating knowledge and sharing ideas (Todd, 2008). But the key point is that it becomes increasingly urgent to extend student use of the Internet to involve the learning of academic disciplines (Asselin & Moayeri, 2008). All learners should be able to recognize what they need to accomplish, determine whether a computer will help them to do so, and then be able to use the computer as part of the process of accomplishing their tasks (Eisenberg, 2003).

According to the the American Association of School Librarians (2008) literate students should be able to

- inquire, think critically, and gain knowledge;
- draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge.

Assignments or studies given by teachers require students to use the Internet and the internet use of the students for educational needs will also enable students to develop the skills mentioned above. These skills could be regarded as predictors of high academic success since these skills will

also bring about meaningful learning. The aforementioned skills are also the capabilities exhibited by students who have a deep learning approach, one which is evaluated within the scope of individual differences. As a matter of fact, there are many researches in the literature that associates high academic success with a "deep learning" approach (Crawford, Gordon, Nicholas & Prosser, 1998, Zeegers, 2001; Byrne, Flood & Willis, 2002; Richardson & Price, 2003; Buck, 2008).

Learning approaches were first identified by Marton and Säljö (1976). The concept incorporates both what students do (strategy) and why they do it (intention) while studying and can reveal either a `deep' (striving for meaning and understanding) or a `surface' (instrumental, reproductive and minimalist) orientation (Marton & Säljö, 1976). A student who adopts a deep approach:

- is interested in the academic task,
- searches for the meaning inherent in the task,
- personalizes the task, making it meaningful to her/his own experience and to the real world,
- integrates aspects or parts of the task into a whole (Leung & Kember, 2003).

And a student who adopts a surface approach:

- sees the task as a demand to be met,
- sees the aspects or parts of the task as discrete and unrelated,
- is worried about the time the task is taking,
- relies on memorization (Leung & Kember, 2003).

In studies involving many thousands of students across many different subjects, the surface learning approach has been associated with perceptions of too high a workload and an assessment which is perceived to require rote learning (Cope & Staehr, 2005). On the other hand, the deep learning approach has been associated with perceptions of good teaching, clear goals, independence in learning, and timely and appropriate assessment feedback (Cope & Staehr, 2005). Learning approaches, contrary to other individual differences, have always been defined as responses to a context rather than inherent individual characteristics (Case & Marshall, 2004). Various studies (see Cope & Staehr, 2005; Wilson & Fowler, 2005; Hall, Ramsey & Raven, 2004; Gordon & Debus, 2002) have demonstrated that changes in the learning environment and the opportunity to work individually impact on the learning approaches of students. Therefore, by using different instructional strategies during the classes it is possible for teachers to develop a student's learning approach from that which is surface to deep.

Overall, educational usage of the Internet will create an environment that allows the student to develop his/her skills by means of which students will be able to think reflectively and achieve certain meta-cognitive skills such as those of comparison and association. In this case, students directed to the activities such as preparing assignments and studying through use of the Internet, can be led to the adoption of similar strategies to those of students with a deep learning approach.

Thus, Turkish Ministry of National Education has started a new project for K-12 and high schools in 2008. The aim of this project is on the subject of integrating educational technology into teaching. Towards this aim, it is stated that "educational technology should be used more efficiently and productively in the classrooms; and teachers should be encouraged integrating the educational technology into instruction and directing their students to use educational devices for their educational needs" (MEB, 2010).

In line with these literature given above, this study aims to better understand secondary school students' Internet use to support their educational needs in respect to their learning approaches. The following research questions guided this study:

1. Does the frequency of Internet use by students vary according to their learning approaches?
2. Does Internet use by students for non-educational purposes vary according to their learning approaches?
3. Does Internet use by students for educational needs vary according to their learning approaches?
4. Does Internet use by students for educational needs vary with teachers asking for study tasks/assignments to be based on the Internet?

2. METHOD

2.1 Instruments

The chief instrument used in this study was an adapted form of the Learning Process Questionnaire (LPQ). The questionaire is developed by Kember, Biggs and Leung (2004) for use with secondary school students and adapted to Turkish by Çolak and Fer (2007).

The LPQ, with deep and surface approach scales, has been used to evaluate the learning approaches of students. This questionnaire is a five-item Likert form is used for the answers on a scale ("never or rarely true for me:1"; "always and almost always true for me:5"). There are 11 items for each learning approach, and the score interval which can be received for each deep approach and surface approach ranges from 11 to 55. As an example two items for each approach from the questionnaire are given respectively: "I try to relate what I have learned in one subject to what I learn in other subjects", "I spend a lot of my free time finding out more about interesting topics which have been discussed in different classes"; "I see no point in learning material which is not likely to be in the examination", "As long as I feel I am doing enough to pass, I devote as little time to studying as I can. There are many more interesting things to do".

Socio-demographic data covering such areas as age, gender, and internet use habits were collected by means of a survey of secondary school students. It took 14 minutes to 25 minutes to answer the survey and the LPQ for the subjects.

2.2 Subjects

A total of 921 secondary school students were recruited for this study from different types of secondary schools in Istanbul. School A is a public school, school B is a public school which accepts students depending on their diploma grades, school C is a public school which accepts students depending on their ranking scores obtained from a nationwide entrance exam, and school D and school E are private schools. School A (n = 280) represented 30.4 % of the sample, School B (n = 172) represented 18.7 % of the sample, School C (n = 132) represented 14.3 % of the sample, School D (n = 231) represented 25.1 % of the sample, and School E (n = 106) represented 11.5 % of the sample.

For each school two or three classes, depending on class population, from each grade were randomly selected. The total student sample consisted of boys 48.1% (n = 443), girls 50.7% (n = 467), and 1.2% (n=11) unknown (not ticked). The mean age for the boys was 16.05 (SD = 1.03, range 14-18) and 15.84 years (SD = 1.00, range 14-18) for the girls, 28 percent of the population was enrolled in Grade 9, 37.5% in Grade 10, and 34.5% in Grade 11.

The total student sample consisted of deep learners, 52.8% (n=486) and surface learners, 47.2% (n=435). Of these, 85% of the students (n=789) have a computer at home, and 68.8% of the population has his/her own computer.

2.3 Data Analysis

The co-relational descriptive method is used in this study. In data analysis, chi-square test was used to compare categorical variables. The significance level was taken as 0.05 in the study.

For internal consistency of the LPQ, the Cronbach alpha values were calculated. The Cronbach alpha values of original questionnaire were 0.82 for a deep approach and 0.71 for a surface approach. In adaptation study these values were respectively 0.79 and 0.72. In this study, Cronbach alpha values were 0.73 for a deep approach and 0.66 for a surface approach.

3. RESULTS AND DISCUSSION

3.1 Internet Use of Students According to their Learning Approaches

Students' frequency of internet use and chi-square results regarding whether or not these frequencies vary according to the learning approaches are seen in Table 1.

Table 1. Chi-Square Test Results Regarding the Comparison of the Frequencies of Internet Use of Students According to their Learning Approaches

		Rarely	Only weekends	Couple days a week	1-2 hours every day	More than 2 hours every day	Total
Deep	N	96	65	122	133	70	486

Learners	% within learning approach	19.8%	13.4%	25.1%	27.4%	14.4%	100.0%
	% within frequency of internet use	56.8%	54.6%	59.2%	50.4%	42.9%	52.8%
Surface	N	73	54	84	131	93	435
Learners	% within learning approach	16.8%	12.4%	19.3%	30.1%	21.4%	100.0%
	% within frequency of internet use	43.2%	45.4%	40.8%	49.6%	57.1%	47.2%
Total	N	169	119	206	264	163	921
	% within earning approach	18.3%	12.9%	22.4%	28.7%	17.7%	100.0%
	% within frequency of internet use	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

X^2=11.629 df=4 p=.020

An analysis of Table 1 reveals that 19.8% of the students with a deep learning approach use the Internet rarely; 13.4% of them use the Internet just at weekends while 25.1% of them use the Internet a couple of times a week. It is also revealed that 27.4% of these students use the Internet for one or two hours every day while 14.4% of them use it for more than two hours every day. As for the students with a surface learning approach, it is seen that 16.8% of them use the Internet rarely, 12.4% of them use it just at the weekends, while 19.3% of them use the Internet a couple of times a week. In addition, it is revealed that 30.1% of these students use the Internet for one or two hours every day while 21.4% of them use it more than two hours every day. This difference between the frequencies of the internet use of the students having different learning approaches was found to be significant [X^2=11.629, p<.05].

Results in Table 1 reveal that the ratio of the students using the Internet regularly every day is 46.4% (28.7+17.7), among all the students. In other words, almost half of the students use the Internet every day. However, considered from the perspective of learning approaches, it is seen that this ratio remains at 41.8% for deep learners, but on the other hand, this rises to 51.5% among the surface students. Results indicate that the frequency of internet use among students having the surface learning approach is considerable when compared to that of the deep learner students. All these results point to the fact that the frequency of internet use of surface students is statistically and significantly higher than that of the deep students. That is to say, surface students spend more time on the Internet when compared to the deep students.

Based on these results, the purposes of the students in using the Internet were examined, according to their learning approaches. Among the choices offered to the students regarding the purposes for which they use the Internet are chatting and communication, entertainment, surfing the Internet, surfing for study needs and using it to prepare for assignments. While surfing for study and to prepare for assignments are evaluated under the title of “Using the Internet for educational needs“, the other three choices (chat, communication and entertainment) are not related to the learning process and are evaluated under the title of “Using the Internet for non-educational purposes”.

3.2 Internet Use of Students for Non-Educational Purposes According to their Learning Approaches

Whether or not the internet use of students for non-instructional purposes varies according to the learning approaches were examined within the framework of the results in Table 2.

Table 2. Chi-Square Test Results Regarding the Comparison of the Internet Use of Students for Non-Educational Purposes According To Learning Approaches

		Chat and Communication[1]			Entertainment[2]			Surfing[3]		
		No	Yes	Total	No	Yes	Total	No	Yes	Total
Deep Learners	N	118	368	486	93	393	486	225	261	486
	% within Learning Approach	24.3	75.7	100.0	19.1	80.9	100.0	46.3	53.7	100.0
	% within Frequency of the Internet Use	53.6	52.5	52.8	55.4	52.2	52.8	53.1	52.5	52.8
Surface Learners	N	102	333	435	75	360	435	199	236	435
	% within Learning Approach	23.4	76.6	100.0	17.2	82.8	100.0	45.7	54.3	100.0
	% within Frequency of the Internet Use	46.4	47.5	47.2	44.6	47.8	47.2	46.9	47.5	47.2
Total	N	220	701	921	168	753	921	424	497	921
	% within Learning Approach	23.9	76.1	100.0	18.2	81.8	100.0	46.0	54.0	100.0
	% within Frequency of the Internet Use	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] X^2= .087 df=1 p=.768 [2] X^2= .552 df=1 p=.457 [3] X^2= .028 df=1 p=.867

Analyzing the results from Table 2, it is seen that the internet use of students for chat and communication [X^2=.087, p>.05], entertainment [X^2=.552, p>.05] and surfing [X^2=.028, p>.05] does not reveal a significant difference statistically according to the learning approaches. These results reveal that conducting non-educational activities on the internet does not vary according to the learning approaches of the students.

Evaluating the results from Table 1 and Table 2 together, it is realized that students having the surface approach spend much more time on the Internet when compared to the students with a deep approach, but on the other hand, there is no difference in the chat, entertainment and surfing choices of the two groups on the Internet. In other words, while using Internet for leisure time activities and communication both the surface learners and deep learners act in the same way; even though there is a significant difference in the frequencies of internet use respecting to their learning approaches. At this point, the question of whether there is any difference in use of internet for educational needs between deep and surface learners arises.

3.3 Internet Use of Students for Educational Needs According to their Learning Approaches

Whether or not the Internet use of students for educational needs vary according to the learning approaches was examined. The results are given in Table 3.

Table 3. Chi-Square Test Results Regarding the Comparison of the Internet Use of Students for Educational Needs According To the Learning Approaches

		Preparing for Assignment[1]			Surfing for Study[2]		
		No	**Yes**	**Total**	**No**	**Yes**	**Total**
Deep Learners	N	117	369	486	134	352	486
	% within Learning Approach	24.1	75.9	100.0	27.6	72.4	100.0
	% within Frequency of the Internet Use	41.5	57.7	52.8	42.5	58.1	52.8
Surface Learners	N	165	270	435	181	254	435
	% within Learning Approach	37.9	62.1	100.0	41.6	58.4	100.0
	% within Frequency of the Internet Use	58.5	42.3	47.2	57.5	41.9	47.2
Total	N	282	639	921	315	606	921
	% within Learning Approach	30.6	69.4	100.0	34.2	65.8	100.0
	% within Frequency of the Internet Use	100.0	100.0	100.0	100.0	100.0	100.0

[1] $X^2 = 20.748$ df=1 p=.000 [2] $X^2 = 20.098$ df=1 p=.000

According to the results from Table 3, the ratio of deep learners regarding use of the Internet for preparing assignment is 75.9%, while their ratio regarding surfing on the Internet for studying is 72.4%. As for the surface students, their ratio regarding use of the Internet for preparing assignments is 62.1%, while their ratio regarding surfing on the internet for study is 58.4%. These results reveal that the uses of students of the Internet for preparing assignments [X^2=20.748, p<.05] and surfing for study [X^2=20.098, p<.05] show statistically significant differences according to their learning approaches. The results suggest that the ratios for the internet use of deep learners for educational needs are statistically higher when compared to those of the surface students.

Evaluating the results given in Table 3 together with the results given in Table 1 and Table 2, it is revealed that surface learners spend more time on the Internet compared to the deep learners, but they spend this time mostly for purposes such as entertainment, chat and surfing while deep learners spend less time on the Internet compared to the surface learners, but spend their time mostly for purposes such as preparing for assignments and surfing for their educational needs.

This statistical significance in the Internet use of deep students and surface learners for educational needs, in respect to their learning approaches, can be explained by considering the learning characteristics of deep students. The most important element in the characterization of a deep approach is the search for understanding (Leung & Kember, 2003). Deep learning represents student engagement in approaches to learning that emphasize integration, synthesis, and reflection (Laird, Shoup, Kuh, & Schwarz, 2008). Different sources that can be accessed through the Internet have a variety and richness which will lay the foundations for deep learners to achieve their goals, and this significant difference in favor of the deep learners can be explained by the existence of these sources.

A deep approach is also likely to result from a relevance to the students' interests, and where students had an opportunity to manage their own learning (Mimirinis & Bhattacharya, 2007). Deep learners can use the Internet to search material relevant to their courses and to help prepare their assignments. This both allows these learners to control their learning and presents a significant environment and an appropriate tool for their search for learning.

As previously mentioned, it is possible for teachers to develop a student's learning approach from that which is surface to deep. Within this frame, it was also examined whether or not the students were directed by their teachers to benefit from the Internet for educational needs.

3.4 Internet Use of Students For Educational Needs According to Whether or Not Their Teachers Give Study Tasks/Assignments Requiring the Use of the Internet

The descriptive statistic values of the answers, given to the question "do your teachers give study tasks/assignments that require you to use the Internet?" are seen in Table 4.

Table 4.Descriptive Statistics Regarding Whether or Not Teacher' Give Study Tasks/Assignments Requiring the Use of the Internet

	f	%
Yes	727	78.9
No	137	14.8
Not Answered	57	6.1

Results from Table 4 reveal that 78.6% of the students are directed by their teachers to prepare their assignments using the Internet, 15.2% of the students mentioned that their teachers do not give assignments requiring them to use the Internet. The aforementioned results indicate that a great majority of the teachers direct their students to use the Internet for educational needs. However, results from Table 3 reveal that deep learners obtain more benefits from this direction.

Whether or not the uses of students of the Internet for educational needs varies according as to whether their teachers give them study task/assignments requiring the use of the Internet was examined within the framework of the results from Table 5.

Table 5.Chi-Square Test Results Regarding The Comparison of The Internet Use of Students For Educational Needs According to Whether or Not Their Teachers Give Study Tasks/Assignments Requiring the Use of the Internet

		Preparing Assignment[1]			Surfing for Study[2]		
		No	Yes	Total	No	Yes	Total
Students given study tasks/assignments	N	200	527	727	227	500	727
	% within Students Asked	27.5	72.5	100.0	31.2	68.8	100.0

requiring the use of the Internet	for Assignments % within Frequency of the Internet Use	76,3	87,5	84,1	76.7	88.0	84.1
Students not given study tasks/assignments requiring the use of the Internet	N	62	75	137	69	68	137
	% within Students Asked for Assignments	45.3	54.7	100.0	50.4	49.6	100.0
	% within Frequency of the Internet Use	23.7	12.5	15.9	23.3	12.0	15.9
Total	N	262	602	864	296	568	864
	% within Students Asked for Assignments	30.3	69.7	100.0	34.3	65.7	100.0
	% within Frequency of the Internet Use	100.0	100.0	100.0	100.0	100.0	100.0

[1] X^2= 17.180 df=1 p=.000 [2] X^2= 18.752 df=1 p=.000

According to the results from Table 5, among the students mentioning that they are asked for assignments requiring the use of the Internet, the ratio of preparing assignments on the internet is 72.4% while their surfing ratio on the Internet for studying is 68.8%. On the other hand, among the students not asked for assignments requiring the use of the Internet, the ratio of preparing assignments on the internet falls to 55.7%, while their surfing ratio on the Internet for studying falls to 50%. These results reveal that the internet use of the students for preparing assignments [X^2=15.141, p<.05] and surfing for studying [X^2=18.380, p<.05] show a significant difference according to whether or not their teachers had required study tasks or given them assignments that required them to use the Internet. According to the results, it can be concluded that students use the Internet for educational needs when they are directed by their teachers positively. If the students were not directed by their teachers to use the Internet for educational needs, it may be possible that the surface learners may not use at all the Internet for educational purposes and the deep learners might use it in a nominal level. It should not to be forgotten that using Internet for non-educational purposes such as chatting, surfing is much more dominant than using it for educational needs. Therefore, this results show that teachers are the key factors to direct students to use the Internet for educational needs.

4. CONCLUSION AND RECOMMENDATION

The rapid spread of information and communication technologies in daily life requires that educational institutions should keep a pace with these changes while developing the curriculums. As suggested by Eisenberg (2003), information literacy skills can be integrated effectively when the skills directly relate to content aspects of the curriculum and to classroom assignments. Studies regarding the integration of information and communication technologies with curriculums will reach the desired point only when the students see information and communication technologies, particularly the Internet, as an instructional instrument. This is a matter of fact according to the

results obtained by Cheung and Huang (2005) in a study conducted on university level that students' internet usage correlated positively with general learning. According to the researchers, the reason for this is "for general learning, Internet use was helpful in terms of enhancing students' motivation to learn, increasing their verbal communication skills, stimulating thought and enhancing creative thinking skills". In a survey of 1,300 US teachers, 66% of the secondary mathematics teachers reported having students use computers to solve problems and analyze data. According to this survey; teachers reported an increase or slight increase in student achievement in research skills (76%), breadth and depth of understanding of subjects taught (64%), problem solving skills (57%), and quality of writing (59%) (Quellmalz & Kozma, 2003).

According to the results of the present research, teachers' directing their students to use the Internet for educational needs in their research, projects and assignments has a positive influence on student behaviors in the uses of the Internet. Two different recommendations may be made to change the behaviors of surface learners in particular, since they tend to use the Internet simply as a leisure time activity. One of them is to direct the students with a surface learning approach by giving them assignments where they can use the Internet for educational needs. As previously emphasized, even if there is a particular learning approach that the students generally prefer and frequently use, this approach is a characteristic which can be changed as a result of influences from their perceptions of the learning environment. Accordingly, a shift from surface learning strategies to deep learning strategies can be made possible through a careful and considered direction by teachers.

A more permanent solution is to enable students to be in the learning environments which will allow them to use the necessary and correct strategies in order to develop a deep learning approach, from the earliest age. Students should adopt a deep learning approach from the earliest age via learning environments where they can control their learning. In these learning environments, teaching methods based on search and questioning must be integrated with measuring methods requiring analysis and synthesis rather than simple memorization. This will bring about beneficent results and will enable students to exhibit high academic performance levels in many regards.

It is also possible to make a suggestion to teachers who will give assignments requiring the use of the Internet as a source. A deep learning approach requires the use of skills such as integration, synthesis, and reflection. For these reasons, when setting assignments, teachers should direct their students to a variety of sources that suggest different perspectives to the same topic and provide alternative information. This, over the course of time, will inevitably encourage students to adopt these learning strategies and a deep learning might be achieved.

Certainly it should be mentioned that as teachers are the key factor for directing students to use the internet for educational needs, teachers themselves also need an in service training to improve their skills to integrate Internet into teaching.

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