

Effects of Educational Blogging on Perceptions of Science and Technology Education Students toward Web as a Learning Tool *

Eğitimsel Blog Yayıncılığının Fen ve Teknoloji Eğitimi Öğrencilerinin bir Öğrenme Aracı olarak Web'e Yönelik Algıları Üzerine Etkileri

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Abstract

The purpose of this study is to investigate effects of educational blogging on perceptions (e.g., attitude, self-efficacy) of undergraduate students in Science and Technology Education program toward Web as a learning tool. In addition, this study examines opinions of the Science and Technology Education students about contribution of educational blogging to the students' perceptions toward Web as a learning tool, knowledge in the field, and advantages and disadvantages of educational blogging. The methodological frame of this study is based on both one group pre-test and post-test design, and qualitative approaches including observations, interviews and document analyses. A total of 32 undergraduate students voluntarily participated in the pre-test and post-test sections, and 25 students participated in the interviews. The findings indicate that educational blogging have positive effects over the students' attitudes on the usability, self-efficacy, affective and Web-based learning subscales. In addition, the qualitative findings reveal positive contributions of educational blogging to the students' knowledge in the field, and to the perceptions and thoughts of the students toward Web as a learning tool.

Keywords: Educational blogging, Perceptions, Science and Technology Education Students

Özet

Bu çalışmanın amacı eğitimsel blog yayıncılığının Fen ve Teknoloji Eğitimi programındaki lisans öğrencilerinin bir öğrenme aracı olarak Web'e yönelik algıları

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(örneğin, tutum, öz-yeterlik) üzerindeki etkilerini incelemektir. Ayrıca, bu çalışma eğitimsel blog yayıncılığının fen ve teknoloji eğitimi öğrencilerinin bir öğrenme aracı olarak Web'e yönelik algılarına katkıları, alandaki bilgilerine katkıları ve eğitimsel blog yayınlamanın avantajları ve dezavantajları hakkındaki görüşlerini incelemektedir. Bu çalışmanın metodolojik çerçevesi tek grup öntest - sontest tasarımı ve nitel veri toplama yaklaşımlarından gözlem, mülakat ve doküman analizlerinden oluşmaktadır. Araştırmanın tek grup öntest ve sontest bölümüne gönüllü olarak toplam 32 öğrenci ve mülakatlara da 25 öğrenci katılmıştır. Bulgular eğitimsel blog yayıncılığının öğrencilerin kullanılabilirlik, öz-yeterlik, duyuşsal alan ve Web-tabanlı öğrenme alt ölçeklerindeki tutumlarına olumlu katkı yaptığını göstermektedir. Ayrıca, nitel bulgular eğitimsel blog yayıncılığının öğrencilerin alandaki bilgilerine ve bir öğrenme aracı olarak Web'e yönelik algılarına ve düşüncelerine olumlu katkı yaptığını işaret etmektedir.

Anahtar Kelimeler: Eğitimsel blog yayıncılığı, Algılar, Fen ve Teknoloji Eğitimi Öğrencileri

I. INTRODUCTION

Web supported teaching and learning activities have become widespread in educational environments over past decade (Andersen, 2007; Alexander, 2008). For instance, educators particularly in higher education use Web in a wide range such as from providing online support for traditional classroom-based courses through the placing of syllabi or readings on the Web to Web-based delivery of entire courses (Brinkerhoff & Koroghlanian, 2005; Göktaş, Yıldırım & Yıldırım, 2009). In addition, various portals and web sites have been developed worldwide to support teaching and learning activities and provide information sources for teachers, administrators, students and parents (Akpınar & Bayramoğlu, 2008).

With the beginning of Web 2.0, Web publishing has become more accessible and easier than ever before. In addition, users are less passive receivers of information and more active co-creators of content in Web 2.0 technologies such as blogs, wikis (Terdiman, 2005, cited in Mason & Rennie, 2007). Today many educators use blogs in their teaching and learning environments (Richardson, 2006; Wang & Hsua, 2008). A blog, or Weblog, is a Web-based technology that allows users to deploy text and other media (e.g., visuals, audio-visuals, etc.) immediately to the Web (Kelley, 2008). Basic blogging activities may be done without any sophisticated Web design and programming skills (Richardson, 2006). Blogs are showing up in various venues such as entertainment, commerce, news, politics and education. In educational environments, teachers and faculty members are using blogs to express their opinions, to promote dialogue in the discipline (Educause Learning Initiative, 2005), to support formation of an online learning community (Kim, 2008), and to support collaboration on the Web (Godwin-Jones, 2003). In addition, faculty members and teachers use blogs as instructional mediums (Educause Learning Initiative, 2005), teaching and learning aids (Williams &

Jacobs, 2004; Martindale & Wiley, 2005), resource centers (Oravec, 2002) and communication channels among themselves and students (Wang & Hsua, 2008).

Moreover, students are increasingly using blogs both as personal commentaries and as a required part of certain courses (Educause Learning Initiative, 2005). Understanding why people accept or reject information technology has proven to be one of the most important and challenging issues in information system research (Davis et al., cited in Liaw 2002a). Also, according to Liaw (2002b), understanding learners' perceptions of information technology is useful and necessary before or during their use of it as an assisted learning tool.

Prior studies (e.g., Liaw 2002a; Liaw 2002b; Teo, Oh, Liu, 2003) investigated different aspects of the individual Web use (e.g., perceptions including attitudes, and self-efficacy, effects of design features on web attitude) and blog use (Hsu & Lin, 2008). According to Liaw (2002a), individual computer and Internet experience, self-efficacy, motivation, enjoyment and usefulness are all key factors for individual use of the Web (Liaw, 2002a). Moreover, the results of Teo, Oh and Liu (2003) study suggest that increased level of interactivity on a Web site have positive effects on user's perceived satisfaction, effectiveness, efficiency, value, and overall attitude toward a Web site. In addition, regarding blog use, the results of Hsu and Lin (2008) study indicated that ease of use, enjoyment, and knowledge sharing were positively related to attitude toward blogging.

Although prior studies have investigated different aspects of perceptions or attitudes of students toward Web and blog uses, effects of educational blog publishing on perceptions of students toward Web as a learning tool have not been sufficiently investigated. Thus, this study focuses on effects of educational blogging on perceptions (e.g., attitudes, opinions) of undergraduate students in Science and Technology Education program toward Web as a learning tool.

1.1. Purpose of the study

The purpose of the study is to investigate effects of educational blog publishing on the science and technology students' perceptions (e.g., attitude, self-efficacy) toward Web as a learning tool. In particular, this study explores whether there are any significant differences between mean attitude scores of the students on usability, self-efficacy, affective (Liaw 2002a) and Web-based learning subscales (Tekinarslan, 2009) of the Web attitude scale (WAS) before and after the educational blogging activities. Furthermore, this study investigates opinions of the students about contribution of educational blogging to their perceptions toward Web as a learning tool. Also, it investigates opinions of the students about contribution of blog publishing to their knowledge in the field, and advantages and limitations of educational blogging in the field of science and technology. Specifically, this study explores the following research questions:

1. Are there any significant differences between pretest and posttest mean attitude scores of the students on usability self-efficacy, affective and Web-based learning subscales?
2. What are the opinions of the students about contribution of educational blogging to their perceptions toward Web as a learning tool?
3. What are the opinions of students about contribution of educational blogging to their knowledge in science and technology?
4. What are the opinions of students about advantages and limitations of educational blog publishing in science and technology?

II. METHODOLOGY

The methodological frame of this study includes *one group pre-test and post-test* design (Büyüköztürk et al., 2008), and *qualitative approaches* including observations, interviews and document analyses (Bogdan & Biklen, 1992).

2.1. Participants

A total of 32 undergraduate students (out of 37) in Science and Technology Education program who registered for the Computer II course voluntarily participated in the one group pre-test and post-test section of the study in the Spring semester of 2009-2010 academic year . The students did not have educational blogging experiences prior to this study.

The participants in the qualitative section of the study were the same students in the one group pre-test and post-test section (N=32) of the study. Furthermore, a total of 25 students participated in the interviews through e-mail to provide additional data regarding their blogging applications.

2.2. Instruments

A Likert-type Web attitude scale with 21 items was used to collect data in the one group pre-test and post-test section of the study in addition to the personnel information section (e.g., gender, area of study, Internet experience). The first 16 items of the scale were adapted from a Web attitude scale (WAS) developed by Liaw (2002a). The WAS is a valid and reliable scale to measure individuals' perceptions' toward Web self-efficacy, liking, usefulness, and behavioral intention to use and learn the Web (Liaw, 2002a), and it has been used in other prior studies (e.g. Akpınar & Bayramoğlu, 2008; Yang & Lester, 2003). The last five items of the scale were adapted from an attitude scale toward Internet-based learning (Tekinarslan, 2008) to measure more specifically the students' attitudes toward Web-based learning. The scale with 21 items was validated and used in Turkish in a prior study (Tekinarslan, 2009).

Moreover, an interview form containing semi-structured questions was used to obtain the students' opinions and experiences about blogging in the field of science and technology education.

2.3. Data collection

In the one group pre-test and post-test section of the study a Likert-type Web attitude scale with 21 items was used to collect data, as mentioned previously. Furthermore, a qualitative fieldwork approach which combined multiple data collection techniques such as participant observations, document analyses, and interviews (Bogdan & Biklen, 1992) was applied in the collection of the qualitative data. The participant observations were conducted by the researcher who was the teacher of the course. Thus, he had opportunities for observations in the computer lab when the students create, edit, and publish their blogs related to science education. The researcher took field notes about noteworthy blogging experiences of the students after a period of observation in the computer lab.

Also, the researcher conducted document analysis based on blog pages and contents of the students. The students e-mailed the teacher about the contents and URL addresses of their blogs related to science education. The e-mails and blog pages of the students were electronically documented for document analysis purposes.

Moreover, the researcher conducted interviews through e-mail with 25 volunteer students who participated in the course and study. The participant students filled out an interview form containing semi-structured questions to reflect their opinions and experiences about blogging in the field of science and technology education. The students (N=25) submitted their interview forms through e-mail attachments in 10 days after the end of the course.

2.4. Data analyses

The data collected in the one group pre-test and post-test section of the study were analyzed by using the software of Statistical Package for the Social Sciences (SPSS). The mean scores and standard deviations were calculated for pre-test and post-test. A paired samples t-test was applied to detect the differences between the pre-test and post-test scores of the participants.

Furthermore, the qualitative data including field notes from observations in the computer lab, blogs, e-mails and interview forms were collected in different electronic files. Then, a content analysis method (Bogdan & Biklen, 1992) was applied to analyze the electronic data. All collected data were read and reviewed by the researcher in order to detect the recurring words, phrases, and thoughts. The detected recurring words, phrases, and thoughts were subsequently identified and marked as the initial coding categories, and the unrelated data were eliminated. After that, these coding categories were read again to generate main and final categories of the study. The findings were reported and reflected by considering these main categories.

III. RESULTS

The results of the study are provided in two sections. In the first section, the results one group pretest and posttest are presented, and results of qualitative research are presented in the following section.

3.1. Results of one group pre-test and post-test section

The differences between the pretest and posttest scores of the students on usability, self-efficacy, affective and Web-based learning subscales are represented in this section.

3.1.1. Differences on usability subscale

The descriptive results in Table 1 show that the pretest mean attitude score ($\bar{X}=31.40$) of the students is lower than their posttest mean score ($\bar{X}=34.28$). A paired samples t-test was applied to determine if there was any significant difference between the pretest and posttest mean attitude scores of the students at .05 significance level. The results in Table 1 indicate that the difference between mean scores of the pretest and posttest of the students is significant on the usability subscale ($t = -2.165$, $df = 31$, $p = .038$). According to this finding, blog publishing positively effected the students' attitudes on the usability subscale of the WAS.

Table 1. Differences between the pretest and posttest scores on usability subscale.

Groups	N	\bar{X}	SD	df	t	P
Pretest	32	31.40	7.11	31	-2.165	.038*
Posttest	32	34.28	3.19			

* $P < .05$

3.1.2. Differences on self-efficacy subscale

The paired samples t-test results in Table 2 indicated that there was a significant difference between the mean scores of the pretest ($\bar{X}=13.53$) and posttest ($\bar{X}=15.53$) of the students on the self-efficacy subscale ($t = -4.228$, $df = 31$, $p = .000$). According to this finding, posttest mean score of the students is significantly higher than their pretest score. Thus, it can be stated that blog publishing had positive impact over the students' attitudes on the self-efficacy subscale of the WAS.

Table 2. Differences between the pretest and posttest scores on self-efficacy subscale

Groups	N	\bar{X}	SD	df	t	P
Pretest	32	13.53	3.43	31	-4.228	.000*
Posttest	32	15.53	2.15			

* $P < .05$

3.1.3. Differences on affective subscale

According to the paired samples t-test results in Table 3, the difference between the mean scores of the pretest ($\bar{X} = 14.12$) and posttest ($\bar{X} = 16.15$) of the students is significant at .05 level on the affective subscale ($t = -3.156$, $df = 31$, $p = .004$). This finding reveals that posttest mean score of the students is significantly higher than their pretest score. According to this finding, blog publishing positively affected the attitudes of the students on affective subscale of the WAS.

Table 3. Differences between the pretest and posttest scores on affective subscale

Groups	N	\bar{X}	SD	df	t	P
Pretest	32	14.12	3.68	31	-3.156	.004
Posttest	32	16.15	1.88			

* $P < .05$

3.1.4. Differences on Web-based learning subscale

The paired samples t-test results in Table 4 indicated that there was a significant difference between the mean scores of the pretest ($\bar{X} = 18.84$) and posttest ($\bar{X} = 21.93$) of the students on the Web-based learning subscale ($t = -4.695$, $df = 31$, $p = .000$). According to this finding, posttest mean score of the students is significantly higher than their pretest score. Thus, it can be stated that blog publishing had positive impact on the students' attitudes on the Web-based learning subscale.

Table 4. Differences between the pretest and posttest scores on Web-based learning subscale

Groups	N	\bar{X}	SD	df	t	P
Pretest	32	18.84	4.02	31	-4.695	.000
Posttest	32	21.93	1.66			

* $P < .05$

3.2. Results of qualitative research section

Observations of the teacher about educational blogging activities of the students, and opinions of the students regarding contributions of educational blogging to the perceptions of the students, contributions of educational blogging to the knowledge of the students, and opinions of the students regarding advantages and limitations of educational blogging are presented in this section.

3.2.1. Observations of the teacher

The students designed and created Web pages through MS FrontPage and MS Publisher, before blog applications. Many students faced notable technical difficulties and problems (e.g., nonworking links, non-openable visuals) when they designed their Web pages through these software (i.e., MS FrontPage and MS Publisher), and they sought help from the teacher to solve these problems.

The educational blogging activities of the students in the field of science and technology were started after they learned simple Web page design in MS FrontPage and MS Publisher. Initially, the teacher showed the students how to open an account, create, edit and publish blog pages in the computer lab. Then, the teacher asked the students create and publish simple blog pages about the topics related to science and technology. A big majority of the students created and published their blog pages with some visuals easily without facing any notable technical difficulties or problems. In addition, blogging activities were enjoyable and favorable for most students in comparison to the web design activities through other software (e.g., M.S. FrontPage).

The students were required to publish educational blog pages which provide information and teach topics in science and technology at least at knowledge and comprehension levels in Bloom's taxonomy. Many students faced difficulties and sought help and ideas from the teacher when deciding and writing instructional objectives and the content based on these objectives although they did not face any notable technical difficulty when they edit and publish their blog pages. In general, most students were able to write the instructional objectives and the content of their blogs after getting ideas from the teacher and benefiting some text books and online resources in the field of science and technology. The students were free to benefit from both online resources and print resources as long as they are reliable. The students in general used online resources when finding digital graphics and images related to their content. But, most students benefited both reliable online and print resources when writing the content of the blogs based on the instructional objectives. Thus, it can be stated that instructional objectives were effective on the students' decisions about whether to use online resources or print resources. Also, many students improved their information searching skills in electronic databases (e.g., Ulakbim) and search engines (e.g., Google, Yahoo, etc.) when they were searching visuals, graphics and information related to their instructional objectives and content of the blogs. Moreover, the students were required to make comments and give feedback about at least two other classmates' blogs. As a result, the students gained experiences about how to make comments, give feedback and state opinions about other classmates' contents on the blogs.

3.2.2. Contributions of educational blogging to the perceptions of students

The students were asked, "Has educational blogging made any positive contributions to your perceptions and thoughts about Web as a learning tool? If yes, why?" Most students (17 out of 25) responded "yes" to the question. After they were asked "why", some students (N=7) stated that because they saw that Web based blogs are convenient tools to share information in multimedia format (e.g., visuals, animations, etc.). Also, according to the some students (N=6), blogs provide time and place flexibilities to share and reach information outside of the class. In addition, some students (N=4) responded that blogs give opportunities to comment on the posts and discuss about the topics and ideas in the blog content.

However, 5 students did not answer whether blogging has made any contribution to their perceptions and thoughts about Web as a learning tool. Also, 3 students answered “no” to the question. One of the students among them stated that blogging has not contributed to his perceptions and thoughts about Web as a learning tool since the Web is just a tool, and quality of information and skills of information providers are more important than the tool.

3.2.3. Contributions of educational blogging to the knowledge of students

The students were asked, “Do you think that educational blogging has made any contribution to your knowledge in the field of science and technology?” Majority of the students (22 out of 25) answered “yes” to the question. After they were asked “If yes, how?” many (N=12) students responded they learned about new information in the field of science and technology when they search and read information to be used or published in their blogs. Moreover, some students (N=5) stated that they had a chance to repeat and improve their prior learning in subjects of science and technology when they write and edit their blog contents. Furthermore, some students (N=3) stated that their knowledge in the field increased when they read and view the materials (e.g., visuals, videos) on the blogs of the other classmates.

Also, one student noted that she practically learned that how science and technology are related as she is blogging about her knowledge in science education in a concrete manner with various visuals. Additionally, another student noted that he gained experiences and he got ideas about how to benefit and integrate blogs into science and technology education.

3.2.4. Advantages and limitations of educational blogging

The student interviewees were asked, “What are the advantages and disadvantages of educational blogging for you?” Nearly all students (N=24 out of 25) stated at least one advantage of educational blogging. The most common advantage of educational blogging is its appropriateness for “information sharing”, according to the students (N=18). Moreover, 7 students mentioned that blogs enables the publishers to receive comments and feedbacks from the visitors or readers about contents of their educational blogs. Besides, 5 students noted educational blogging increase the corporation and communication among the classmates while they are making comments on their blogs. In addition, according to the 4 students, easy to use features without sophisticated technical skills is another advantage of educational blogging. One of the students stated that, “Dissemination of information and opinions from just one source to many people without complicated technical skills is the most important advantage of blogs for me. When become a teacher I can share many information and post announcements to my students easily”.

However, three students noted that wrong information and faulty expressions on the blogs can be considered as disadvantages of blogs, although they

think that blogs are handy tools to share information. One of the students stated that, "People may create and publish their blogs easily. However, some blogs have a lot of wrong information that lead us wrong directions. This is the only disadvantage of blogs I think". Also, two students mentioned that copy and paste features in blogs may reduce or inactivate creativity and may instigate the students to plagiarism when creating the content.

IV. DISCUSSION and CONCLUSION

This study investigated whether there were any significant differences between mean attitude scores of the students on usability, self-efficacy, affective (Liaw 2002a) and Web-based learning subscales (Tekinarslan, 2009) of the Web attitude scale (WAS) before and after the educational blogging activities. Furthermore, this study explored the opinions of the students about contribution of educational blogging to their perceptions toward Web as a learning tool.

The findings indicated that the posttest mean scores of the students were significantly higher than their pretest mean scores on the usability, self-efficacy, affective and the Web-based learning subscales. According to these findings, it can be stated that educational blog publishing had positive effect over the students' attitudes on the usability, self-efficacy, affective and Web-based learning subscales.

Furthermore, the qualitative results revealed that educational blogging made positive contributions to the most students' perceptions and thoughts about Web as a learning tool since the blogs are convenient tools to share information in multimedia format (e.g., visuals, animations, etc.), since blogs provide time and place flexibilities to share and reach information outside of the class, since blogs give opportunities to make comments and discuss about the topics and ideas in the blog content. Although some students (N=3) reflected that educational blogging did not make any contribution to their perceptions and thought about Web as a learning tool, based on the opinions of the majority of the students (N=17) and results of pre-test and post-test results, blogging in general can be considered as useful activity to improve students perceptions and thoughts about Web as a learning tool. Moreover, the findings of this study in regard to perceptions of the students toward educational blogging support the results of a prior study (Kuzu, 2007; Weller, Pegler and Mason, 2004) which indicated that students had positive views, opinions and attitudes toward instructional use of blogs.

In addition, according to the findings, majority of the students thought educational blogging has made positive contributions to their knowledge in the field of science and technology. The students explained that they learned about new information in the field of science and technology when they search and read information to be used or published in their blogs, they had a chance to repeat and improve their prior learning in subjects of science and technology when they write and edit their blog contents, and their knowledge in the field increased when they read and view the materials (e.g., visuals, videos) on the blogs of the other

classmates. Thus, based on these findings, it can be stated that blogging in a teaching and learning environment can be used to improve students' knowledge in the field of science and technology. Furthermore, the results of the current study regarding the contribution of blogging to the knowledge of the students are consistent with the prior studies which suggest that blogs can be used to facilitate students' learning (Stiler & Philleo, 2003) and knowledge acquisition (Glogoff, 2005).

According to the findings of this study and related literature, the advantages of the educational blog can be listed as information sharing among the classmates or online learning community (Kim, 2008), making comments and receiving feedbacks from the visitors or classmates (Huette, 2006), potentials for corporation and communication among the classmates (Wang & Hsua, 2008), and easy to use features without sophisticated technical skills (Duffy & Bruns, 2006).

To conclude, the results of pre-test and post-test procedure suggest that educational blogging is an effective activity to promote students perceptions or attitudes toward Web as a learning tool. In addition, the qualitative results supports the results of pre-test and post-test procedure by revealing positive contributions of educational blogging to the perceptions and thoughts of the students toward Web as a learning tool. Also, the qualitative results suggest that blogging for educational purposes make contributions to the students' knowledge in the field. Thus, educational blogging can be considered as a convenient activity to improve the students' perceptions toward Web as a learning tool, and to enhance the knowledge of the students in fields such as science and technology.

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