STUDENTS' PERCEPTION OF E-LEARNING IN THE TECHNICAL VOCATIONAL SCHOOL

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ABSTRACT

Through the rapid expansion of information technologies, Learning Management Systems have become one of the most important innovations for delivering education. However, successful implementation and management of these systems are primarily based on the students' perception. In this context, this study aimed to reveal students' perception of e-learning in the technical vocational school. A total of 320 students were surveyed using an instrument adapted from that of Liaw (2008). The findings showed that perceived usefulness is a critical factor that influences students' satisfaction with e-learning systems. Perceived usefulness and perceived satisfaction significantly change with respect to students' programs. Moreover, results of this study on technical vocational education can be valuable in the respect of providing an extension for the previous findings.

Keywords: Perception, e-learning, Vocational Technical Education, Undergraduate Education, Technology Acceptance Model

TEKNİK MESLEK YÜKSEKOKULU ÖĞRENCİLERİNİN E-ÖĞRENME ALGILARI

ÖZET

Bilgi teknolojilerindeki düzenli gelişmeyle, "Öğrenme Yönetim Sistemleri" eğitimin aktarılmasında en önemli buluşlardan biri olmuştur. Ancak bu sistemlerin başarılı bir şekilde uygulanması ve yönetimi öncelikle öğrencilerin algısına bağlıdır. Bu bağlamda, bu çalışma bir teknik meslek yüksekokulunda e-öğrenme hakkındaki öğrenci algılarını ortaya çıkarmaya çalışmıştır. Liaw (2008)'ın ölçeğinin uyarlanmasıyla elde edilmiş ölçekle 320 öğrenci üzerinde araştırma yürütülmüştür. Bulgular öğrencilerin e-öğrenme sistemlerinden memnuniyetini etkileyen kritik faktörün algılanan kullanışlılık olduğunu göstermiştir. Algılanan kullanışlılık ve algılanan memnuniyet öğrencilerin okuduğu programa göre anlamlı değişiklik göstermektedir. Bunun yanı sıra, mesleki teknik eğitim üzerine yapılan bu çalışmanın sonuçları daha önceki bulgulara anlamlı bir katkı sağlaması açısından da değerlidir.

Anahtar Kelimer: Algı, e-öğrenme, Mesleki Teknik Eğitim, Lisans Eğitimi, Teknoloji Kabul Modeli

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INTRODUCTION

Based on the theory of constructivism, humans 'construct' their own knowledge instead of simply receiving information. Therefore, the learner-centered model has been frequently proposed as a trend in contemporary education (American Psychological Association, 1997). Meanwhile, with the tremendous developments of information technologies, electronic learning (e-learning) has become a significant method that provides and facilitates learner-centered education, and the other challenges in educational practices. Finding an evidence for the tremendous growth in e-learning is not so difficult. For example, the U.S. Department of Defense, an organization that spends more than US$17 billion annually on military training, recently committed to the development of the Advanced Distributed Learning network. This initiative is designed to capitalize on the capabilities of computer technology to make education and training available to more than three million military personnel – and online instruction is considered a critical component of the this network (Fletcher, Tobias & Fisher, 2007).

E-learning uses network technologies to create, foster, deliver, and facilitate learning, anytime and anywhere. The benefits of e-learning have been discussed in many articles (Concannon, Flynn & Campbell, 2005; Koşar, Çiğdem & Coşkunserçe, 2009; Liaw, Huang, & Chen, 2007; Liu, Liao & Pratt, 2009; Sumak, Hericko & Pusnik, 2011). Despite the benefits of e-learning and despite the growth of the e-learning market in recent years, researches indicate that high rates of students who commence e-learning courses are not satisfied with them (Bouhnik & Marcus, 2006; Dutton & Perry, 2002; Liaw, 2008). This suggests that something is not working properly in e-learning systems (Liaw 2008). In this respect, some researchers have attempted to identify particular learner and environmental characteristics, conditions for satisfaction with e-learning environment and learning activities that might affect developing effective e-learning environment (Bouhnik & Marcus, 2006, Topçu, 2008). In other words, e-learning environment characteristics such as synchronous or

asynchronous, learner characteristics such as ages, self-concept, gender etc. and learning activities in this environment have effect on students' satisfaction with technology which is related to technology acceptance (Sahin & Shelley, 2008; Sumak, Hericko & Pusnik, 2011).

One of the most-cited models related to technology acceptance (Lee, Cho, Gay, Davidson & Ingraffea, 2003) provides a basis to explain the impact of variables such as beliefs, attitudes, and intentions on using a technological application. In this model, computer use is determined by behavioral intention that is formed by perceived usefulness and attitude. Namely, use of e-learning environment might be stimulated by two dimensions of motivators: extrinsic (perceived usefulness) and intrinsic (satisfaction) (Cheung & Huang, 2005).Perceived usefulness is described as "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational content" (Davis et al., 1989, p. 985). Studies on e-learners have revealed that perceived usefulness positively predicts students' academic performance and satisfaction (Lee 2002; Miltiadou & Savenye, 2003). So, perceived usefulness and satisfaction constitute students' perception (Sahin & Shelley, 2008). In this study, Davis et al. (1989)'s definition of perceived usefulness was adopted and applied, and the role of satisfaction and perceived usefulness of e-learning environment to understand students' perception of e-learning was investigated. A course failing to meet students' needs may lead to low levels of satisfaction and in turn low level of participation (Hall, 2001). Moreover, without investigating what satisfies students in online courses, it is difficult to meet their needs and improve their learning (Sahin & Shelley, 2008). In summary, student perception is linked to improved academic performance as well as continued learning (Sloan, n.d.), the decision to take additional classes (Booker & Rebmon, 2005) and the admission of future students.

As a result, the literature showed that both perceived usefulness and satisfaction directly affect undergraduate students' intention to use e-learning resources (Lee, Cheung & Chen, 2005). Beyond just a few studies, however, little is known about how students' perception is in a postsecondary educational environment. Therefore there is a significant

need for the investigation of the students' perception of e-learning in the vocational technical postsecondary school in Turkey. This study will explore the following research questions:

1. Are there any significant differences between students in computer technology program and electronic communication technology program regarding students' perception of e-learning?
2. What is the relationship between perceived usefulness of e-learning system and satisfaction?
3. What do students think about e-learning system?

METHODS

Participants

Study participants consisted of 320 undergraduate students enrolled in "Computer Networking Systems" course in a vocational technical school in Turkey. Thirty-three students were from "Computer Technologies" (CT) program, other students were from "Electronic Communication Technologies" (ECT) program.

The blended course

Course materials were accessible over the intranet on learning management system (LMS) named "portal". "Computer Networking Systems" course was designed and developed as a blended course for this study. The instructors specified intended course outcomes in terms of learning goals and objectives. After that, the content, the learning activities, and the assessment tools were developed based on the main learning goals and objectives. In the instructional process, formal and informal data was gathered from students who had already taken this course.

Duration of the course was 15 weeks. In every week, learners had the opportunity to meet each other and the instructor in the classroom for 100-minute face to face (F2F) lecture. At the beginning of the every week's

F2F lecture sessions, students were presented with the learning objectives of each lecture. After the F2F lecture, students were presented with "networking activities" to complete in the networking lab. After the completion of related activities by the students, the feedback related to common mistakes and a short summary of the lecture were given. Students who could not participate in the F2F lectures in the lab were expected to log onto the course individually from the intranet. Students could read the content of related week's course material, download resources such as lecture notes, videos, slides and journal papers, and follow instructions to complete activities of the week. Course quizzes and self-evaluation questions were given online. Students' evaluation was based on their performance in online summative quiz and in exam at the end of the semester.

E-learning system

In this research, MOODLE was used as LMS tool. MOODLE is open-source software and a free LMS tool (http://moodle.org), with a modular organization and interface. According to Goyal and Purohit (2011) MOODLE has been designed based on the ideas of constructivist pedagogy and allows collaborative learning. MOODLE offers many different functions, varying from course management to monitoring student activities; it can be utilized as a storage place for course materials. In addition to this, it also offers the possibility to develop forums, wikis, quizzes, questionnaires, group works and other interactive activities, without any need for particular computer programming skills. The main advantage of such a learning environment can be described as being self-contained and well organized; all the tools described above are integrated on the same platform, thus creating the feeling of being in a classroom – though a virtual one.

The main functions of the portal include: course homepage, teaching/learning materials and quizzes. Homepage of the course provides overall course information (as shown in Figure 1) including course syllabus, course resources, assessment criteria and other information related to the course.

Figure 1. Computer Network Systems Course Homepage

Materials used in the course (as shown in Figure 2), presented in the form of Power Point slides, MS Word, Acrobat PDF documents, and video files which can be accessed by the students at anytime and anywhere through portal on intranet.
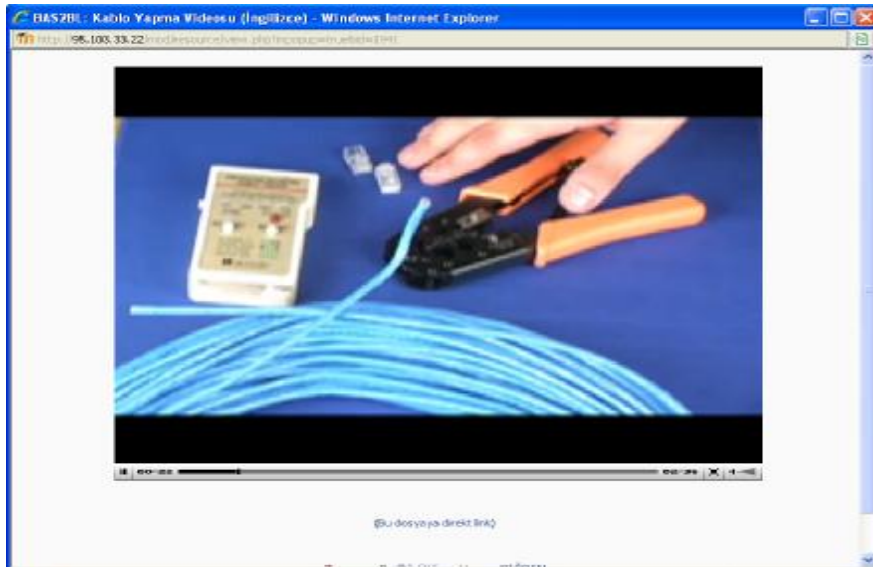
Figure 2.A course material offered on MOODLE as a video

Short quizzes (as shown in Figure 3) including multiple choice, short-answer, true/false, or matching questions were made available online for the students who want to test their own knowledge and learning level.
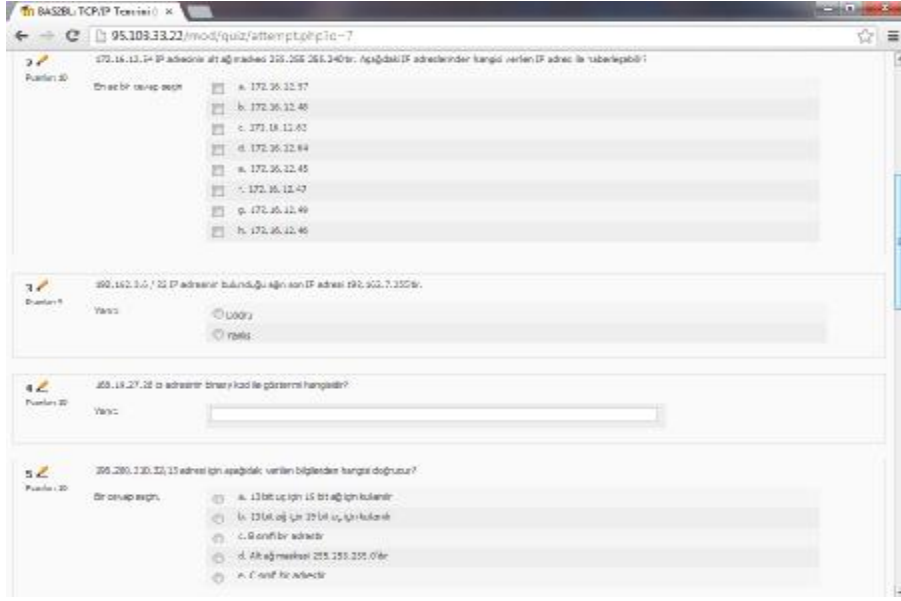

Figure 3.Online quiz

Students receive immediate feedback on whether or not their answers are correct, and what the correct response should be for each question. Instructors can also provide homework assignments online allowing students to upload their assignment files before the deadline.

Data collection instrument

The students complete an instrument with three sections at the end of the semester. The first section includes some items to gather the students' demographic/personal data. The second section evaluates students' satisfaction and perceived usefulness about the blended course. It includes 10 items with five-point Likert scale. The items are presented positively worded statements. The parts "e-learner satisfaction" has 5 items

and "e-learner perceived usefulness" has also 5 items which were adapted from that of Liaw (2008), such as: "I am satisfied with e-learning content"; "I am satisfied with learning contents", "I believe e-learning contents are useful", "I believe e-learning can assist learning motivation". The items were coded from 5 (strongly agree) to 1 (strongly disagree). A higher score indicates more favorable perceptions toward the e-learning system. Last section includes an open ended question. The question inquires whether the students like or dislike the portal. It also directs them to justify their opinion. Qualitative data are collected through the students' responses.

Data Analysis

All the data were gathered from the students who had already taken the course. Based on the coding system, the mean and the frequency of the responses were computed. For research question one, t-tests were conducted, Pearson correlations were used to answer research question two and for research question three qualitative data were analyzed thematically following a qualitative approach (Miles & Huberman, 1994) searching specifically for the following information:

●Key themes or common threads found by reading and re-reading the responses from the open-ended questions within the online instrument;

●Any commonality in phrases or sentences that may be used by respondents.

RESULTS

Demographics

Demographics data were as in the Table 1.

Table 1*Demographics*

		n	Percentages (%)
Gender	Male	289	99.3
	Female	2	0.7
Ages	18	1	0.3
	19	20	6.9
	20	136	46.7
	21	93	32.0
	22	33	11.3
	23-27	8	2.7
Having Computer	Yes	184	63,2
	No	107	36,8
Access Internet	Yes	125	43,0
	No	166	57,0

All subjects were asked to respond to the instrument and their responses were guaranteed confidentiality and they were told that the data gathered would only be used for academic purposes. All of 320 students filled out the questionnaire and 160 students wrote their opinions about the portal. Due to missing responses, 29 of them were not used for the analysis. Therefore, the study sample comprised to 291 students.

Reliability

In order to determine the internal reliability of the scale, researchers performed a reliability analysis with the use of Cronbach's alpha after the data collection phase by using SPSS 17.0 computer software. A reliability

coefficient of Cronbach's alpha was used. The reliability analysis showed an adequate consistency of the entire scale perception of the e-learning system with ten items (α= 0.848), wherein it was possible to form a summated scale for: perceived usefulness of the e-learning system with five items (α= 0.819) and student's satisfaction of the e-learning system with five items (α= 0.764). According to Fraenkel & Wallen (2005), an alpha value of 0.70 is considered suitable to make possible group inferences that are accurate enough and according to Hair et al. (2009), the lower limit for Cronbach's alpha was 0.70, although it may also been decreased to 0.60 in exploratory research.

Descriptive statistics

The average mean of the five items designed to measure students' satisfaction was 3.485, indicating that students were moderately high satisfied with e-learning system. Similarly, the average mean of the five items designed to measure perceived usefulness for e-learning system was 3.123, indicating that students found e-learning system as moderately high useful (Table 2).

Table 2 *Descriptive Statistics for Students' Perception of E-learning System*

Factors	Items	Mean	SD
PERCEIVED SATISFACTION		3.485	.732
M1	I am satisfied with using e-learning functions	3.546	.954
M2	I am satisfied with multimedia instruction	3.601	.989
M3	I am satisfied with using e-learning as a learning assisted tool	3.144	1.145
M4	I am satisfied with e-learning contents	3.436	.931
M5	I am satisfied with e-learning content	3.701	1.072
PERCEIVED USEFULNESS		3.123	1.027
M6	I believe e-learning can assist learning efficiency	3.116	1.367
M7	I believe e-learning contents are informative	3.295	1.327
M8	I believe e-learning can assist learning motivation	2.993	1.359
M9	I believe e-learning system can help me get better results from courses	3.412	1.301
M10	I would like to see e-learning system implemented further in departmental modules	2.800	1.412
PERCEPTION		3.304	.779

The mean and SD for the total of the scale "student perception for the e-learning system" was as 3.304 and .779, respectively. The mean scores of groups CT and ECT for perceived satisfaction were 4.046 and 3.421 whereas these of CT and ECT for perceived usefulness were 3.873 and 3.037.

Differences in perceived usefulness, satisfaction and perception with respect to students' programs

An independent t-test was performed in order to ascertain whether or not there was a significant difference between the groups in the degree of perceived usefulness, perceived satisfaction and perception. Results led us to the conclusion that that CT students (*M* = 3.873, *SD* = .895) were significantly higher than ECT students (*M* = 3.037, *SD* = 1.008) on perceived usefulness of the e-learning system; t(289)=4.34, p<.001, and also CT students (*M* = 4.046, *SD* = .609) were significantly higher than ECT students (*M* = 3.421, *SD* = .718) on satisfaction with the e-learning system;

t(289)=4.57, p<.001, and CT students (*M* = 3.960, *SD* = .673) were significantly higher than ECT students (*M* = 3.229, *SD* =.756) on perception of the e-learning system, t (289)=5.06, p<.001.

Correlations among the variables

The correlations among the variables of the study are presented in Table 3. There is a significant positive correlation between students' satisfaction and perceived usefulness (p<.001). On the other hand, there is significant negative correlation between age and the other variables (p<.001).

Table 3 *Correlations among study variables*

	Age	Satisfaction	Perceived Usefulness	Perception of E-learning System	Final Test Score
Age	-				
Satisfaction	-.162**	-			
Perceived Usefulness	-.170**	.557**	-		
Perception of E-learning System	-.188**	.837**	.921**	-	
Final Test Score	-162**	-.060	.081	.025	-

**. Correlation is significant at the 0.01 level (2-tailed).

There is no significant correlation between the final test scores of the course and students' perception of e-learning system.

Students' Opinions about E-Learning System; Qualitative Results

A qualitative analysis was performed on the responses of 160 students to the open-ended question used in the instrument. Students were asked to write down their opinions about whether they liked or disliked the portal they used. They were asked to provide reasons, as well. Two raters independently categorized the qualitative data as 0 = "did not like the e-learning system", 1 = "undecided about e-learning system", and 2 = "liked e-learning system". The Students expressed their feelings in very simple terms and the sentences were short (because of limited space on the online instrument) so the inter-rater reliability was .991. Table 4 summarizes the results of the qualitative data.

Table 4 *Numbers and percentages of students with opinions about e-learning system*

	N	%
Liked – Positive	130	71
Did not like – Negative	6	3
Not Enough	33	18
Undecided	14	8
Total	174	100

The largest number of student responses (71%) was positive about the portal. Responses below were common:

The Portal had a lot of advantages for us; it was useful for restudying course content that we couldn't understand (Student 25)

Only a few number of student responses (3%) were negative about portal. Responses such as below were:

I have doubt whether or not portal is good, because some lecturers didn't teach the content in detail due to non-existence of it on the portal (Student 60)

Some of student responses (18%) were positive but they think that e-learning system should be improved. Responses such as below were common:

The Portal is useful however I believe that more videos should be added   (Student 11)

Portal is useful for making course content understandable. I think that adding more videos would support our learning. Moreover, these videos should include the additional explanations of the lectures (Student 24).

CONCLUSIONS, DISCUSSIONS AND IMPLICATIONS

The aim of this study was to investigate students' perception of e-learning at the level of vocational technical post-secondary education. The findings of the study indicated that they have moderately high level of satisfaction with, perceived usefulness for and perception of the e-learning system. Moreover, noncommissioned officers from CT program have significantly higher positive perception of e-learning system than those from ECT program.

Consistent with the previous findings, the present study on the domain of vocational technical education provides with a supporting extension for existing literature on the significant positive relationship between students' satisfaction and perceived usefulness (Davis et al., 1989;Hayashi, Chen, Ryan & Wu,2004; Sun, Tsai, Finger, Chen & Yeh, 2008).Contrary to researchers' findings (Delaney, 2008; Lo, 2010; Melton, Graf & Chopak-Foss, 2009; Paechter,Maier & Macher, 2010) that student satisfaction can be viewed as a both outcome of the learning process and a requirement for successful learning, there was no significant correlation between course final test scores and students' perception of e-learning

system. Furthermore, the study supports previous researches (Gilbert, 2007; Joiner et al., 2005; Ozkan & Koseler, 2009; Paechter, Maier, & Macher, 2010) by finding significant difference between CT and ECT students that the students' experience level on computer and Internet application affect their perception of e-learning. Lastly, not consistent with some of the previous research findings (Lim, 2001; Wang & Newlin, 2002), this study showed that there is a significant relation between the ages of students and perception of e-learning system.

Some students did not have a computer or insufficient internet access. Besides, e-learning system was new in this technical vocational school. Therefore, students should be trained about LMS at the beginning of the semester. Moreover, LMS infrastructure has some technical problems that cause inefficient use of it. Therefore students' perceptions of e-learning were not evaluated with respect to these technical characteristics. Another important limitation was that this study was conducted in a male dominated technical vocational school and researchers did not make a gender-based evaluation. Future researches may verify this study's findings by including students' gender as a variable. Moreover, the study implies that the students' perception should be investigated in a learning environment which each student has broadband internet access and computers having high capacities. Furthermore, it is essential to continuously investigate the factors such as level of education (undergraduate, postsecondary, secondary etc.), type of education (vocational, technical, engineering etc.) and environment of education influencing the perceived usefulness of and the e-learning satisfaction.

REFERENCES

American Psychological Association. (1997). Learner-centered psychological principles*: A framework for school redesign and reform.* Washington, DC: Author.

Booker, Q.E., & Rebman, C.E: (2005). E-Student retention: Factors affecting customer loyalty for online program success. *Issues in Information Systems, 1 (1),* 183-189.

Bouhnik, D.,& Marcus, T. (2006). Interaction in distance-learning courses. *Journal of the American Society Information Science and Technology*, *57(3),* 299–305.

Cheung, W., & Huang, W. (2005).Proposing a framework to assess Internet usage in university education: An empirical investigation from a student's perspective. *British Journal of Educational Technology, 36 (2),* 237-253.

Concannon, F., Flynn, F.,& Campbell, M. (2005) What campus based students think about the quality and benefits of e-learning, *British Journal of Educational Technology,36(3)*, 501–512.

Davis, F. D., Bagozzi, R. P., &Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*, 982–1003.

Delaney, A. M. (2008). Why faculty–student interaction matters in the first year experience. *Tertiary Education and Management, 14(3)*, 227–241.

Dutton, J., & Perry, J. (2002). How do online students differ from lecture students? *Journal of Management Information Systems, 18(4),* 169–190.

Fletcher J.D., Tobias S. & Wisher R.A. (2007). Learning anytime, anywhere: advanced distributed learning and the changing face of education. *Educational Researcher, 36*, 96–102.

Fraenkel, R.M. &Wallen, N.E. (2006).*How to design and evaluate research in education. (6th Edition).*New York: McGraw-Hill International Edition.

Gilbert, J. (2007). E-learning: The student experience. *British Journal of Educational Technology, 38(4),* 560–573.

Goyal, E.,& Purohit, S. (2011). *Using Moodle to Enhance Student Satisfaction from ICT.*2011 IEEE International Conference on Technology for Education.191-198.

Hair, J.F., Black,W.C., Babin, B.J., & Anderson, R.E. (2009).*Multivariate Data Analysis–A Global Perspective*. New Jersey: Pearson Education Inc.

Hall, J.C. (2001). Retention and wastage in FE and HE. The Scottish Council for Research in Education, Retrieved June 25, 2008, from http://www.ulster.ac.uk/star/resources/retention%20and%20wastage_hall.pdf

Hayashi, A., Chen, C., Ryan, T., & Wu, J. (2004).The role of social presence and moderating role of computer self-efficacy in predicting the continuance usage of e-learning systems*. Journal of Information Systems Education, 15 (2),* 139–154.

Joiner,R., Gavin,J., Duffield, J., Brosnan,M., Crook,C., Durndell,A., Maras,P., Miller,J., Scott,A.J., &Lovatt, P.(2005). Gender, Internet identification, and Internet anxiety: Correlates of Internet use. *Cyber Psychology& Behavior, 8(4):* 371-378.

Koşar, E., Çiğdem, H. & Coşkunserçe, O. (2009).*Blended learning approach at computer courses.* Proceedings of 9th International Educational Technology Conference, Ankara, Turkey.93-99.

Lee, C. (2002). The impact of self-efficacy and task value on satisfaction and performance in a Web-based course. *Dissertation Abstracts International 63*, 1798. (UMIno. 3054599).

Lee, J.-S., Cho, H., Gay, G., Davidson, B., & Ingraffea, A. (2003).Technology acceptance and social networking in distance

learning. *Educational Technology & Society, 6(2)*, 50-61, (ISSN 1436-4522)

Lee, M.K., Cheung, C.M., & Chen, Z. (2005). Acceptance of Internet-based learning medium: the role of extrinsic and intrinsic motivation. *Information & Management*, *42*, 1095-1104.

Liaw, S.S. (2008). Investigating students' perceived satisfaction, behavioral intention, and effectiveness of e-learning: A case study of the Blackboard system. *Computers & Education, 51 (2)*, 864–873

Liaw, S. S., & Huang, H.M. (2007).Developing a collaborative e-learning system based on users' perceptions. *Lecture Notes in Computer Science, 4402*, 751–759.

Lim, C.K. (2001) Computer self-efficacy, academic self-concept, and other predictors of satisfaction and future participation of adult distance learners. *American Journal of Distance Education, 15*, 41–51.

Liu, S., Liao, H.,& Pratt, J.A. (2009).Impact of media richness and flow on e-learning technology acceptance. *Computers & Education, 52 (3)*, 599-607.

Lo, C.C. (2010). How student satisfaction factors affect perceived learning. *Journal of the Scholarship of Teaching and Learning, 10(1)*, 47–54.

Melton, B., Graf, H., &Chopak-Foss, J. (2009). Achievement and satisfaction in blended learning versus traditional general health course designs. International Journal for the Scholarship of Teaching and Learning, 3(1) (Retrieved June 12, 2013, from http://academics.georgiasouthern.edu/ijsotl/ v3n1/articles/PDFs/Article_MeltonGrafChopak-Foss.pdf)

Miles, M. B.,& Huberman, A.M. (1994). *Qualitative data analysis: An expanded sourcebook.* Sage Publications, Thousand Oaks, CA.

Miltiadou, M.,& Savenye, W.C. (2003).Applying social cognitive constructs of motivation to enhance student success in online distance education. *Association for the Advancement of Computing in Education Journal, 11,* 78–95.

Moodle site. URL: http://moodle.org.

Ozkan, S., &Koseler, R. (2009). Multi-dimensional students' evaluation of e-learning systems in the higher education context: An empirical investigation. *Computers & Education*, *53(4)*, 1285–1296.

Paechter, M., Maier, B., & Macher, D. (2010). Students' expectations of and experiences in e-learning: Their relation to learning achievements and course satisfaction. *Computers & Education*, *54(1),* 222–229.

Sahin, I., & Shelley, M. (2008).Considering students' perceptions: The distance education student satisfaction model. *Educational Technology & Society, 11(3)*, 216–223.

Sloan (n.d.).*The 5 pillars of quality online education.* The Sloan Consortium. Retrieved, July 20, 2013 from http://sloanconsortium.org/5pillars

Sumak, B., Hericko, M. &Pusnik, M. (2011). A meta-analysis of e-learning technology acceptance: The role of user types and e-learning technology types. *Computers in Human Behavior*, *27 (6),* 2067–2077

Sun, P.C., Tsai, R.J., Finger, G., Chen, Y.Y., &Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers& Education, 50 (4)*, 1183–1202.

Topçu, A. (2008). Intentional repetition' and learning style: Increasing efficient and cohesive interaction in asynchronous online discussions. *British Journal of Educational Technology, 39 (5),* 901-919.

Wang, A. T., &Newlin, M.H. (2002). Online lectures: Benefits for the virtual classroom. *THE Journal, 29*, 17-22.