Hacettepe Üniversitesi Eğitim Fakültesi Dergisi (H. U. Journal of Education) 29(1), 169-179 [2014]

Determining the Factors of Affecting the Moodle Use by Using TAM. The Story of a University after a Destructive Earthquake*

Moodle Kullanımını Etkileyen Faktörlerin TAM kullanılarak Belirlenmesi: Yıkıcı Depremden Sonra Bir Üniversite Hikâyesi

Eylem KILIÇ**

ABSTRACT: A destructive earthquake happened in October 2011 in one of the cities at Eastern Region of our country and it caused big damages in the city. All educational system affected negatively and university in the city had to break down its education. It was even not possible to continue education because of huge damages and heavy weather condition at city. In order to solve this problem, it was decided to use Moodle to continue education at the university. All students and instructors except for the medical and dental faculties were obliged to use Moodle during 2011-2012 fall semesters. Therefore, the purpose of this study is to investigate the factors which might affect the intention to use Moodle by university students using Technology Acceptance Model (TAM) in case of earthquake. A survey method was used to collect data. Purposive sampling was used and 501 university students were participated in the current study. The data were analyzed by using descriptive statistics and the proposed model was tested by using structural equation model. The proposed model has seven constructs and nine hypotheses have been generated from the connections among these seven constructs. Except for the one hypothesis, the model supported the entire hypothesis proposed in the model. Implications and discussion are made in light of the results.

Keywords: Moodle usage, technology acceptance model, earthquake

ÖZ: 2011 yılının Ekim ayında Türkiye'nin doğusunda bulunan bir ilde yıkıcı bir deprem yaşandı ve şehirde büyük hasarlar meydana geldi. Şehirde yürütülen tüm eğitim faaliyetleri depremden olumsuz bir şekilde etkilendi ve bu olumsuzluklardan ötürü üniversitede de eğitime ara verildi. Eğitime devam etmek, ağır hava koşulları ve meydana gelen büyük hasarlar yüzünden neredeyse imkânsız hale geldi. Bu problemin üstesinden gelmek ve öğretime devam edilebilmek için üniversite yöneticileri tarafından 2011-2012 güz yarıyılı için eğitimin uzaktan yapılmasına olanak tanıyan Moodle kullanılması kararlaştırıldı. Tıp ve Diş Hekimliği Fakültesi dışında, tüm öğretim elemanları ve öğrencilerin derslerin devamı için Moodle kullanması zorunlu tutuldu. Bu nedenle, bu çalışmanın amacı deprem sonrası ders yönetim sistemi olarak üniversite öğrencileri tarafından kullanılan Moodle'un kullanımını etkileyebilecek faktörleri Teknoloji Kabul Modeli çerçevesinde araştırmaktır. Verilerin analizinde temel betimsel istatistikler ve önerilen modeli test etmek amacıyla yapısal eşitlik modellemesi kullanılmıştır Önerilen modelde yedi faktör ve bu faktörler arasındaki ilişkilerden üretilen dokuz hipotez bulunmaktadır. Bir hipotez dışında, modelde test edilen tüm hipotezler desteklenmiştir. Elde edilen sonuçlar ışığında tartışmalar ve öneriler yapılacaktır.

Anahtar sözcükler: Moodle kullanımı, teknoloji kabul modeli, deprem

1. INTRODUCTION

Not only private but also governmental institution has been forced to use information system (IS) for various purposes at their institution (Turel 2013). Actually, embedding the IS into the institution is inevitable in this era. Course Management Systems (CMS), as an information technology, has been widely used as a part of academic systems in higher education. There are commercial course management systems such as Blackboard, WebCT and eCollege used by several institutions (Ullman & Rabinowitz 2004). On the other hand, Moodle is one of the open source CMSs for online learning. Moodle composed of many tools that can be used for creating successful e-learning experiences in face to face instruction, distance education and blended courses (Brandl 2005). Compared to Blackboard, it is found that every module or function except for the discussion board of Moodle is favored by course participants (Unal & Unal 2011). However, it is known that if the user fails to use the system, no matter what it is, commercial or open source, it will not be fully utilized. Hence, it needs to be adapted by the students and the

**Assist.Prof.Dr. Yuzuncu Yıl University, Faculty of Education, Van-Turkey, keylem@gmail.com

students' perceptions regarding the use and acceptance of the system should be investigated. Technology Acceptance Model (TAM) developed by Davis (1989) aims to explain the effects of system factors that have influence on user acceptance of information system through user perception (Suh & Han 2002; Lingyun & Dong 2008). Perceptions are defined as an actual interaction between instructional conceptions and a peculiar learning environment. Assessing perceptions can give information about the actual use of learning environment (Lowyck, Elen & Clarebout 2005).

1.1. Review of Literature

TAM has become one of the most widely used models in IS research. The reason for this is that it is understandable and simple (King & He 2006). The TAM is widely-used in studies to understand how users' beliefs and attitudes affect their technology usage intentions (Teo 2009; Teo 2010; Teo & Noyes 2011; Teo et al. 2009; Venkatesh & Davis 2000). Based on the Theory of Reasoned Action (TRA) (Ajzen & Fishbein 1980), the TAM explains how users' beliefs and attitudes affect their intention to use a specific technological device by positing that technology usage is determined by behavioral intentions to use a system that is in turn jointly determined by the user's attitude and perceived usefulness. Attitude is also jointly determined by perceived usefulness and perceived ease of use. Lastly, perceived usefulness is influenced by perceived ease of use and several external variables such as system features, training, documentation and user support (Wong & Teo 2009; Teo 2009; 2010; Teo & Noyes 2011). The fundamental constructs of user acceptance of a system is perceived usefulness and perceived ease of use (Chau 1996). Attitude refers to the degree to which a user likes or dislikes using technology. Perceived usefulness refers to the belief that the use of new technology will improve job performance and productivity while perceived ease of use refers to the belief that the use of the new technology does not demand considerable time and effort. In an extended TAM model, it is proposed that perceived usefulness can be divided into two distinct types which are near –term usefulness and long-term usefulness. It was found that both constructs has a positive relationship with behavioral intention (Chau 1996).

From the literature, the TAM has received considerable support and used in educational settings to investigate various issues including: student acceptance of online courses, effective learning tools, e-learning, gender differences in pre-service teachers, and pre-service teachers' perceptions of computer technology in relationship to their intention to use computers (Dishaw & String 1999; Lee et al. 2009). Stoel and Lee (2003) investigated the effects of student experience with web based learning technology on the acceptance of web based courseware. It is found that experience with the technology positively affects perceived ease of use. In an earlier study, it was found that the user perceptions of ease of use, usefulness and usage have been affected with the user computer experiences (Igbaria, Guimaraes & Davis 1995). The course website acceptance was also investigated by using TAM (Selim 2003; Ramayan &Ignatius 2005). They found that course website usefulness and ease of use are the key determinants of the acceptance and usage of course website in learning technology.

In the context of the Moodle, Pavlič et al. (2011) proposed a theoretical model of technology acceptance model based on qualitative findings of their studies. In another study, the factors affecting acceptance and use of Moodle was investigated by TAM and it is found that the actual use of Moodle depends on behavioral intentions and attitudes toward using Moodle (Šumak et al. 2011). Motivational factors such as technical support and perceived self-efficacy was also investigated for web based system using TAM. It was found that technical support has a direct effect on perceived usefulness and perceived ease of use (Sanchez & Heuros 2010; Seferoglu 2007). In a recent study, the effects of perceived usefulness for the professor, perceived compatibility for student tasks and training were investigated in the context of Moodle using TAM. It was found that perceived usefulness for professor has effect on perceived usefulness and

intention to use, on the other hand, perceived compatibility with students has a positive relationship with perceived ease of use, but there is no significant relationship between perceived compatibility with student task and perceived usefulness (Escobar-Rodriguez & Monge-Lozano 2011). Even though several research studies were conducted with TAM and Moodle use, the current study is the preliminary study to find out the appropriateness of Moodle use in case of earthquake.

1.2. Research Model and Hypothesis

The purpose of this study was to investigate factors affecting the undergraduate students' perceptions of Moodle using the technology acceptance (TAM) research model by structural equation modeling (SEM) approach. The following hypothesis guided the current study,

H1: There is a positive relationship between technical support and computer self-efficacy
H2: There is a positive relationship between computer self-efficacy and perceived ease of use of Moodle
H3: There is a positive relationship between computer self-efficacy and perceived usefulness of Moodle
H4: There is a positive relationship between perceived usefulness for professor and perceived usefulness of Moodle
H5: There is a positive relationship between perceived usefulness for professor and student's Moodle usage intention
H6: There is a positive relationship between perceived ease of use and perceived usefulness.
H7: There is a positive relationship between perceived ease of use and student's attitudes towards using Moodle.
H8: There is a positive relationship between perceived usefulness and student's attitudes towards using Moodle.
H9: There is a positive relationship between attitude toward use and student's Moodle usage intention

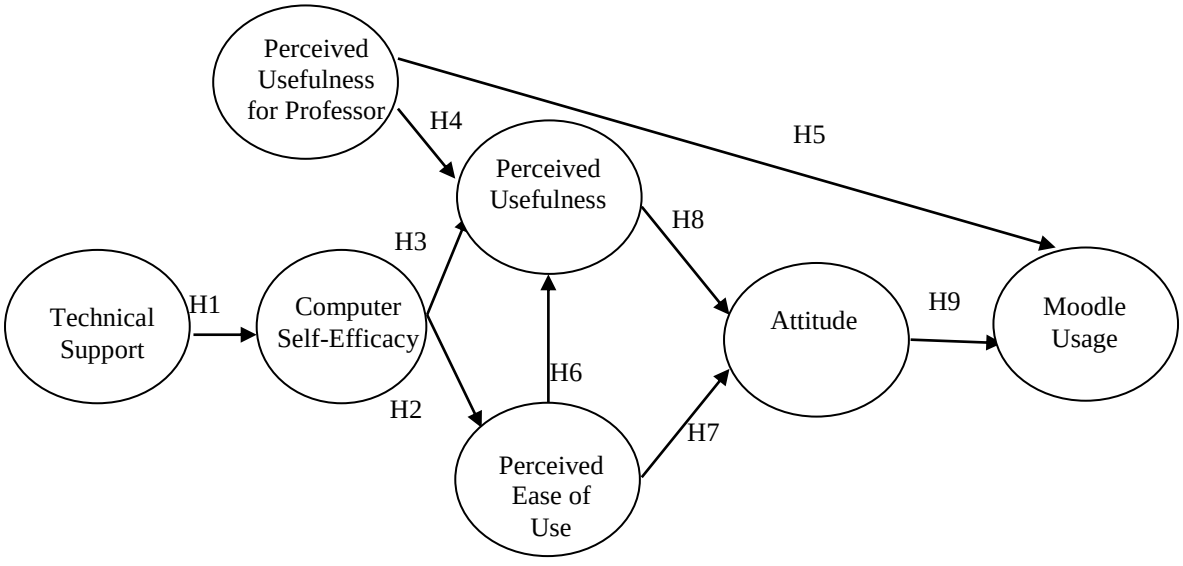


Figure 1. Research model and hypothesis

2. METHOD

In this study, survey research design was used. The questionnaire was filled by the students on courses in condensed education program in 2011-2012 fall semesters. The participants in this study were 501 (n= 501) undergraduate students studying at Faculty of Engineering (n=84), Higher National Diploma (n=22). Faculty of Science (n= 58), Faculty of Art (n=23), Faculty of Agriculture (n=30) and Faculty of Education (n=231). The gender distribution of this sample given in Table 1 was approximately similar. The participants' ages ranged from 18 to 25 years. Most of the participants were senior (n=201) and sophomores (n=241). Most of the students' experiences level is around intermediate and expert so it can be said that their computer and Internet experiences were similar. Their computer experiences were intermediate (n=300) and expert level (n=131). According to their Moodle experiences participants can be accepted as novice (n=148) and intermediate (n=248) level after getting courses through Moodle. The number of courses ranged from three to five (n=125) to five to eight (n=182).

Table 1: The Participants' Characteristics

Variable		Frequency	Percentage (%)
Gender	Female	223	45.8
	Male	264	54.2
Age	17-19	22	4.4
	20-22	267	53.9
	23-25	164	33.1
	25 or older	42	8.5
Faculty	Faculty of Engineering	84	18.8
	Higher National Diploma (2 year degree)	22	4.9
	Faculty of Science	58	12.9
	Faculty of Art	23	5.1
	Faculty of Agriculture	30	6.7
	Faculty of Education	231	51.6
Year	Freshmen	41	8.6
	Sophomores	141	29.4
	Junior	96	20
	Senior	201	41.9
Computer Experiences	Novice	59	11.8
	Intermediate	300	60.2
	Expert	131	26.3
	Advance	8	1.6
Internet Experiences	Novice	43	8.7
	Intermediate	264	53.2
	Expert	165	33.3
	Advance	24	4.8
Moodle Experience	Novice	148	31.2
	Intermediate	248	52.2
	Expert	76	16.0
	Advance	3	0.6
Number of courses	2	57	13.1
	3-5	125	28.8
	5-8	182	41.9
	Other	70	16.1

2.1. Context and Procedure

A destructive earthquake happened in one of the cities in eastern region of Turkey in October 2011 and it caused big damages in the city. All educational institutions were affected negatively and the university in the city had to break down its education. The administrative staff at the university decided to use Moodle to deliver the course content to all of the university students, and then two week condensed education program was given to the students face to face.

All students and instructors, except the medical and dental faculty, were obliged to use Moodle for teaching and learning purposes during 2011-2012 fall semesters. At this point, it is helpful to provide some information about technological context of the university before the earthquake has happened. Almost all faculties have computer laboratory and freshmen at all departments take two computer courses which are mandatory in the university. However, it is really difficult to claim that technological tools have been used for educational purposes at the university. Both instructors and students do not have enough knowledge about technological tools that are being used for educational purposes. Actually, it is the first time that the university has provided e-mail address for the students, which has happened just after installing Moodle. Thus, it can be said that the technological context of the university is weak. After installing Moodle, computer center provided help by videos and documents on how to use Moodle for the instructors and the students. Face to face training was also given to instructors. Although some support was given to the instructors and the students by computer support center, the instructors and the students faced with many problems while using the Moodle. As a result, the purpose of this study was to find out the acceptance of Moodle by the students when it is used in case of the earthquake.

2.2. Data Collection

Moodle Questionnaires: The questionnaire consisted of two parts. The first part consisted of items related to student personal and academic data. The second part had 24 items related to the each of the constructs included in the model. The survey items were measured using a five point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The survey items were developed based on the previous literature. The instrument was translated from English to the other language by two expert having PhD degree in educational sciences. And then, an English teacher translated it from the language to English. Minor changes were done and the survey was rearranged for the current study. These 24 statements took part under the seven constructs: 1.) Perceived usefulness (PU- four items), 2.) Perceived ease of use (PEU-three items), 3.) Attitudes toward use (ATU-three items), and 4.) Behavioral intention (BI-three-items) were adapted from Šumak et al. (2011). 5.) Computer self-efficacy (CSE-three items) items were developed for the current study, 6.) Technical support (TS-four items) was applied from a scale adapted by Igbaria (1990) and 7.) Perceived usefulness for professor (PUP- four items) was taken from Escobar-Rodriguez and Monge-Lozano (2011).

2.3. Data Analysis

Structural equations model (SEM) is a multivariate method composed of factor and multiple regression analysis to estimate dependency relationships. Technically, the structural equation modeling estimates unknown coefficients taking place in linear structural equations set. In the equation system, directly observed variables and latent variables, which are related to observed variables but not observed, usually take place. SEM assumes that there is a causal structure among the latent variables set and observed variables are the explanatory of the latent variables (Byrne 1998; Hayduk 1987; Joreskog & Sorbom 2001). SEM is followed with the Maximum Likelihood estimation method, using the LISREL computer program. Therefore, a Confirmatory Factor Analysis (CFA) is carried out to evaluate the reliability and validity of the measurement scales of all variables included in the proposed model. Once the measurement model is validated, the causal model of structural equations is presented.

3. FINDINGS

The result of the CFA indicates that all standardized loadings exceeded 0.50. Fit criteria of the model were calculated as $\chi^2 / df = 2.77$; RMSEA=0,061; NFI=0,95; CFI=0,97;IFI=0.97 and AGFI=0,87. All these statistics supported the overall measurement quality for the constructs

utilized in this study. It is indicated that if Root Mean Square Error of Approximation (RMSEA) value is equal or lower than 0,05 it means a good fit. On the other hand, if it is between 0,05 and 0,08 it shows sufficient fit level. In this study, RMSEA was found sufficient. Normed Fit Index (NFI) gets values between 0 and 1. The higher the value of NFI the better the fit index is going to be. The value of 0,95 shows a good fit. Comparative Fit Index (CFI) also gets values between 0 and 1. The value of 0,97 shows a good model fit based on independent model (Çelik 2009). Incremental Fit Index (IFI) values that exceed .90 are regarded as acceptable. Adjusted Goodness of Fit Index (AGFI) values of 0,95 shows well fit (For model fit criteria, see Schermelleh-Engel, Moosbrugger & Müler 2003; Bryne 1998; Jöreskog & Sorbom 2001). The coefficients of Cronbach's alpha for 7 constructs were ranging from 0,74 to 0,86 which are acceptable for the study (Nunnally 1978). The Cronbach's alpha of the survey was found 0, 92. Additionally, the Composite /Construct Reliability (CR) and the Average Variance Extracted (AVE), as presented by Fornell and Larcker (1981), were calculated in order to determine whether the measurement variable was representative of the related construct. Construct reliability is a reliability measure based on the square of the total of factor loadings for a construct. AVE represents the overall amount of variance in indicators accounted for by a construct. In Table 2, all AVEs were 0.050 or higher, and exceeded the cutoff value of 0.050 (Fornell & Larcker 1981), and all CRs were 0.75 or higher and exceeded the cutoff value of 0,70 (Nunnally & Bernstein 1994).These results supported the convergent validity of each of the constructs involved in the research model of this study.

Table 2: Confirmatory Factor Analysis Result

Latent Variables / Items		Std. Fac. Loading	t-value	Cronbach α (> 0.70)	CR (> 0.70)	AVE (> 0.50)
Technical Support (TS)						
	TS1	0,70	16,27	0,76	0,78	0,53
	TS2	0,77	18,16			
	TS3	0,67	15,31			
	TS4	0,61	13,74			
Perceived Usefulness for Professor (PUP)						
	PUP1	0,68	15,20	0,74	0,75	0,57
	PUP2	0,68	15,19			
	PUP3	0,70	15,68			
	PUP4	0,55	11,84			
Computer Self-Efficacy (CSE)						
	CSE1	0,67	-	0,76	0,75	0,50
	CSE2	0,73	12,65			
	CSE3	0,71	12,39			
Perceived Ease of Use (PEOU)						
	PEOU1	0,78	-	0,74	0,85	0,65
	PEOU2	0,82	18,07			
	PEOU3	0,82	18,34			
Perceived Usefulness (PU)						
	PU1	0,57		0,86	0,80	0,50
	PU2	0,76	11,76			
	PU3	0,78	11,96			
	PU4	0,71	11,40			
Attitude toward use (ATU)						
	ATU1	0,71		0,81	0,81	0,60
	ATU2	0,81	15,23			
	ATU3	0,78	15,20			
Behavioral Intention (BI)						
	BI1	0,76		0,82	0,81	0,58
	BI2	0,80	15,22			
	BI3	0,73	14,46			

The structural model and hypotheses were tested by examining path coefficients and their significance at the level of 0.05. Path coefficient was determined by calculating correlations among constructs proposed in the model. As presented in Table 3, 8 out of 9 hypotheses formulated within the scope of the research model were statistically confirmed. An H1 hypothesis, which is assumed to have had respectively a positive impact on CSE, was found to be statistically significant. The impact of TS on CSE was 0.46. This means that when technical support offered for Moodle is increased one unit, the impact of this on CSE will be an average of 0.46 points. TS which are assumed to have affected CSE, caused the variation in CSE by 0.21%.The relationship between CSE, which is expressed in H2 and H3, and respectively PEOU and PU latent variables were statistically significant. CSE mostly affected PU (β = 0.58, t = 7.26), then PEOU (β = 0.49, t = 8.12). The relationship between PEOU and PU (H6), which are formulated in classic TAM, was validated (β = 0.24, t = 4.26). However, hypothesis H4, which claim that PUP latent variable, has a positive effect on the perceived usefulness, was not statistically validated (β = 0.09, t = 1.90). On the other hand, as assumed in H5, the relationship between PUP and BI was validated (β = 0.44, t = 8.22). PUP and ATU latent variables caused the variation in behavioral intention by 37 %. Hypothesis H8, which claimed that there would be a positive significant relationship between PU, which is one of the main hypotheses of the classic TAM, and ATU, was confirmed (β = 0.18, t = 3.16). The relationship between PEOU and ATU was also validated (β = 0.58, t = 9.16). The impact of PEOU on ATU was 0.58. This means that when perceived ease of use for Moodle is increased one unit, the impact of this on ATU will be an average of 0.58 points. PEOU and PU latent variables caused the variation in attitude by 48 %. In addition, CSE, PUP and PEOU latent variables caused the variation in perceived usefulness by 54 %.

Table 3: Hypotheses Coefficients of the Proposed Research Model

Hypotheses	Effects	*Path Coefficient*	*t* –value	Remarks
H1	TS→CSE	0.46	7.85	Supported
H2	CSE→PEOU	0,49	8.12	Supported
H3	CSE→PU	0,58	7.26	Supported
H4	PUP→PU	0.09	1.90	Not Supported
H5	PUP→BI	0.44	8.22	Supported
H6	PEOU→PU	0.24	4.26	Supported
H7	PEOU→ATU	0.58	9.16	Supported
H8	PU→ATU	0.18	3.16	Supported
H9	ATU→BI	0,36	6,83	Supported

4. DISCUSSION and RESULTS

The result of this study shows that Moodle provide opportunities for teaching and learning process even in case of an earthquake. Although the technical infrastructure of the university is weak and it is not possible to say that both the instructors and students were capable of using technological tool effectively and efficiently, it can be concluded that the students have behavioral intention to use the learning management system. The relationship between technical support and computer self-efficacy was found significant in the current study. Most of the students' experiences of Moodle were around intermediate after getting courses on Moodle. This might be the reason for the significant relationship that is being found between technical support and computer self-efficacy in that they had never used Moodle before and so the support may enhance their efficacy.

The relationships among computer self-efficacy, perceived usefulness and perceived ease of use was found significant and this result was consistent with the literature (Igbaria, Guimaraes & Davis 1995; Ramayan &Ignatius 2005; Selim 2003; Stoel & Lee 2003). As pointed out by Teo (2009), users' perceptions of their capability to use technology have a significant and positive effect on their behavioral intention to use technology. Avcı-Yucel and Gulbahar (2013) review research studies conducted on TAM from 1999 to 2010 and they stated that technological competency was found effective in four studies and it was found meaningful in nineteen research studies. The only hypothesis that is not supported is the relationship between perceived usefulness for the professor and perceived usefulness. The reason for this result might be related to the inappropriate use of Moodle by the instructors. Most of the instructors used Moodle simply uploading the course content to the system and they do not fully utilize the features of the system. On the other hand, the relationship was found significant in the previous study (Escobar-Rodriguez & Monge-Lozano 2011). The results of this study also show that Moodle usefulness for professors affect their behavioral intention to use Moodle.

In conclusion, it is stated that cognitive, environmental and technological factors having impact on users' acceptance and adoption of the ISs should be taken into account by designers of e-learning for successful implementation (Teo, Wong, Thammetar & Chattiwat 2011).The study provides additional evidence for the validation of TAM for Moodle platform by university students in case of an earthquake. This study provides important implications for the acceptance of Moodle and develops an understanding how to improve the utilization of learning management system in higher education by the university students.

5. REFERENCES

Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior,* Prentice Hall: New Jersey, NJ.

Avcı-Yucel, U., & Gulbahar, Y. (2013). Technology Acceptance Model: A Review of the Prior Predictors *Ankara University, Journal of Faculty of Educational Sciences, 46*(1), 89-109.

Brandl, K. (2005). Are you ready to "*Moodle*"?, *Language Learning & Technology*, *9*,16-23.

Byrne, M. B. (1998). Structural equation modeling with LISREL, PRELIS and SIMPLIS: Basic concepts, applications, and programming. New Jersey: Lawrence Erlbaum.

Chau, P. Y. K. (1996). An empirical investigation of factors affecting the acceptance of CASE by systems developers. *Information and Management*, *30*(3), 269–280.

Celik, H. E. (2009). Yapısal eşitlik modellemesi ile bir uygulama: Genişletilmiş online alışveriş kabul modeli Unpublished PhD thesis, Eskişehir Osmangazi University, Natural Scineces

Davis, F., D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*,319-340.

Dishaw, M. T., & Strong, D. M. (1999). Extending the technology acceptance model with task-technology fit constructs. *Information and Management, 36*(1), 9–21.

Escobar-Rodriguez, T. & Monge-Lozano, P. (2011). The acceptance of Moodle technology by business administration students. *Computers &Education, 58*, 1085-1093

Fornell, C., & Larcker, D. (1981). Evaluating structural equation models with unobservable and measurement error. *Journal of Marketing Research, 18*(1), 39–50.

Hayduk, L. A. (1987). *Structural equation modeling with LISREL: Essentials and advances*. Baltimore: John Hopkins.

Igbaria, M. (1990). End-user computing effectiveness: A structural equation model. *OMEGA, 18*(6), 637–652.

Igbaria, M.; Guimaraes, T., & Davis, B. (1995). Testing the Determinants of microcomputer usage via a structural equation Model, *Journal of Management Information Systems, 11*(4), 87-114.

Joreskog, K., & Sorbom, D. (2001) *LISREL 8: User's reference guide*. Chicago, USA: Scien-tific Software International Inc.

King, W. & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & Management, 43*,740-755.

Lee, B. C., Yoon, J. O., & Lee, I. (2009). Learners' acceptance of e-learning in South Korea: Theories and results. *Computers & Education, 53*, 1320-1329.

Legris, P., Ingham, J. & Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management, 40*(3), 191–204.

Lingyun, Q., & Dong, L. (2008). Applying TAM in B2C E-Commerce Research: An extended model, *Tsinghua Science & Technology, 13*, 265-272.

Lowyck, J., Elen, J., & Clarebout, G. (2004). Instructional conceptions: Analysis from an instructional design perspective. *International Journal of Educational Research, 41*, 429-444.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York, NY: McGraw-Hill.

Nunnally J.,C. & Bernstein I.H. (1994). *Psychometric Theory.* New York, NY: McGraw-Hill.

Pavlič,L.,Pušnik, M., Heričko,M., & Šumak, B.(2011). Qualitative Analysis: Identification of the Factors Influencing e-Learning System Acceptance. Paper presented at *The Third International Conference on Mobile, Hybrid, and On-line Learning.*

Ramayah, T., & Ignatius, J. (2005). Impact of perceived usefulness, perceived ease of use and perceived enjoyment on intention to shop online. *ICFAI Journal of Systems Management (IJSM), 3*(3), 36 – 51.

Sánchez, R. A., & Hueros, A. D. (2011) Motivational factors that influence the acceptance of Moodle using TAM, *Computers in Human Behavior, 26*, 1532-1640

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

Seferoglu, S. S. (2007). İlköğretim bilgisayar dersi öğretim programı: Eleştirel bir bakış ve uygulamada yaşanan sorunlar. *Eğitim Araştırmaları-Eurasian Journal of Educational Research*, 29, 99-111.

Selim, H. M. (2003). An empirical investigation of student acceptance of course websites. *Computers & Education, 40*, 343-360.

Stoel, L., & Lee, K. H. 2003. The Effect of Experience on Student Acceptance of Web-based Learning Technology. *Internet Research: Electronic Networking Applications and Policy*. *5*(13), 364-374. (IF: 0.690).

Suh, B., & Han. I. (2002). Effect of trust on customer acceptance of Internet banking, *Electronic Commerce Research and Applications*, *1*, 247-263.

Šumak, B., Heričko,M.,Pušnik, M., & Polančič, P. (2011). Factors Affecting Acceptance and Use of Moodle: An Empirical Study Based on TAM**,** *Informatica*, 35, 91-100.

Teo, T. (2009). Modelling technology acceptance in education: A study of pre-service teachers, *Computers & Education*, 52, 302-312.

Teo, T. (2010). A structural equation modelling of factors influencing student teachers' satisfaction with e-learning. *British Journal of Educational Technology*, *41*(6), E150-E152.

Teo, T., & Noyes, J. (2011). An assessment of the influence of attitude and perceived enjoyment on the intention to use technology among pre-service teachers: A structural equation modelling approach. *Computers & Education*, *57*(2), 1645-1653.

Teo, T., Lee, C. B., Chai, C. S., & Choy, D. (2009). Modelling pre-service teachers' perceived usefulness of an ICT-based student-centred learning (SCL) curriculum: A Singapore study. *Asia Pacific Education Review*, *10*(4), 535-545.

Teo, T.**,** Wong, S. L., Thammetar, T., & Chattiwat, W. (2011). Assessing the e-learning acceptance of university students in Thailand. *Australasian Journal of Educational Technology*, 27(8), 1356-1368.

Turel, V. (2013). The use of educational technology at tertiary level. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi [Hacettepe University Journal of Education], 28*(2), 482-496. http://www.efdergi.hacettepe.edu.tr/201328-2VEHBİ%20TÜREL.pdf. Retrieved on Nov. 22, 2013.

Ullman, C., & Rabinowitz, M. (2004). Course management systems and the reinvention of instruction. THE Journal. From www.thejournal.com/articles/17014. Retrieved on Jan. 20, 2012.

Unal, Z., & Unal, A. (2011). Evaluating and Comparing the Usability of Web-based Course Management Systems, *Journal of Information Technology Education*, *10*, 19-38

Venkatesh, V. & Davis, F. D (2000). A Theoretical extension of the technology Acceptance Model: Four longitudinal field studies. *Management Science*, *46*, 186-204.

Wong, S. L., & Teo, T. (2009). Investigating the technology acceptance among student teachers in Malaysia: An application of the Technology Acceptance Model (TAM). *The Asia-Pacific Education Researcher, 18*(2), 261-272.

Uzun Özet

2011 yılının Ekim ayında Türkiye'nin doğusunda bulunan bir ilde büyük bir deprem yaşandı. Şehirde büyük hasarlar meydana geldi ve şehirde yürütülen tüm eğitim faaliyetleri depremden olumsuz bir şekilde etkilendi. Bu şehirde bulunan üniversitede de eğitime ara verildi. Bu problemin üstesinden gelmek ve öğretime devam edilebilmek için üniversite yöneticileri tarafından ders yönetim sistemi olarak Moodle kullanılmasına karar verildi. 2011-2012 güz ve bahar yarıyılı için eğitimin uzaktan yapılabilmesi için Moodle kullanılması kararlaştırıldı. Tıp ve Diş Hekimliği Fakültesi dışında, tüm öğretim elemanları ve öğrencilerin derslerin devamı için Moodle kullanması zorunlu tutuldu. Bu nedenle, bu çalışmanın amacı deprem sonrası ders yönetim sistemi olarak üniversite öğrencileri tarafından kullanılan Moodle'un kullanımını etkileyebilecek faktörleri Teknoloji Kabul Modeli çerçevesinde araştırmaktır.

Teknoloji Kabul Modeli (TKM) Davis (1989) tarafından geliştirilen ve kullanıcıların teknoloji karşısındaki davranışları açıklamaya yarayan bir modeldir. Bu model, Düşünülmüş Eylem Teorisi (Theory of Reasoned Action) üzerine yapılandırılan ve bilgi sistemleri alanında en yaygın kullanılan modellerden biridir. Teknoloji Kabul Modeli kullanıcıların inançlarının ve tutumlarının onların teknolojik bir ürünü kullanma niyetlerini nasıl etkilediğini açıklamaya çalışmaktadır. Teknoloji kabul modeli eğitim alanında çeşitli konuları araştırmak için kullanılan bir yöntemdir. Teknoloji Kabul modelinin temel bileşenleri algılanan fayda ve algılanan kullanım kolaylığıdır. Algılanan fayda veya yarar, kullanılan yeni teknolojinin iş performansını ya da verimini arttıracağına olan inançtır. Algılanan kullanım kolaylığı ise yeni teknolojik ürünlerin kullanımının fazla zaman ve emek gerektirmeyeceği inancıdır. TKM'deki temel olan bu bileşenler, yeni teknolojiye karşı kullanıcıların tutumunu, niyetini ve gerçek davranışı açıklayacağını varsaymaktadır. Teknoloji kabul modelinin eğitim ve diğer alanlarda yaygın bir şekilde kullanılması, davranışın açıklanmasında Teknoloji Kabul Modelinde farklı değişkenler kullanılmasına sebep olmuştur

Araştırmada betimsel araştırma yöntemlerinden tarama modeli kullanılmıştır. Amaçlı örneklem kullanılmış ve 501 öğrenci çalışma grubunu oluşturmuştur. Anket iki bölümden oluşmaktadır. Anketin birinci bölümünde demografik bilgilere ilişkin maddeler bulunurken ikinci bölümde 24 maddeden oluşan likert tipi bir ölçek kullanılmıştır. Anketteki maddeler alan yazında yapılmış çalışmalardan derlenmiştir. Ölçekte 7 faktör bulunmaktadır. Bunlar: 1.) Algılanan fayda (4 madde),2.) Algılanan kullanım kolaylığı (3 madde), 3.) Kullanıma yönelik tutum (3 madde 4.) Davranışsal niyet (3 madde), , 5.) Bilgisayar öz yeterliliği (3 madde), 6.) Teknik destek (4 madde 7.) Öğretim üyeleri için algılanan fayda (4 madde). Verilerin analizinde temel betimsel istatistikler ve önerilen modeli test etmek amacıyla yapısal eşitlik modellemesi kullanılmıştır.

Bu noktada üniversitenin teknolojik alt yapısı ve durumu hakkında bilgi vermek çalışmanın anlaşılması ve önemi açısından yararlı olacaktır. Üniversiteye devam eden öğrencilerin tümü ilk yıllarında zorunlu iki tane bilgisayara giriş dersi almaktadır. Her fakültenin bir bilgisayar laboratuvarı bulunmaktadır. Ama yine de, üniversitede eğitim amaçlı teknolojik araçların kullanıldığını söylemek oldukça zordur. Üniversitede deprem öncesi, bir ders yönetim sistemi ve öğrencilere kurum tarafından verilen bir mail adresi bulunmamaktaydı. Hem öğretim üyelerinin hem de öğrencilerin eğitim amaçlı teknolojik araçların kullanımına ilişkin yeterli bilgi sahibi olduklarını da söylemek oldukça zordur. Bu nedenle üniversitenin teknolojik durumunun zayıf olduğu söylenebilir. Üniversitenin bilgi işlem daire başkanlığı, bu sınırlılıkları göz önüne alarak hem öğrenciler hem de öğretim üyeleri için Moodle'ı nasıl kullanacaklarını anlatan kılavuzlar yerleştirmiştir. Aynı zamanda, öğretim üyelerine Moodle kullanımına ilişkin seminerler vermişlerdir.

Katılımcıların özelliklerine bakıldığında kadın ve erkek oranının birbirine çok yakın olduğu bulunmuştur. Kalıtımcılar çoğunluğu 20 ile 25 yaş arasındadır. Çalışmaya altı farklı fakülteden öğrenci katılmıştır. Bu katılımcıların çoğu eğitim fakültesi öğrencisi (N=231 kişi) olup ikinci (N=141 kişi) ve dördüncü sınıfa (N=201 kişi) devam etmektedirler. Katılımcıların, bilgisayar tecrübelerine bakıldığında ise çoğunluğunun bilgisayar tecrübesinin orta (N=300 kişi) ve uzman (N=131 kişi) seviyesinde olduğu bulunmuştur. Moodle üzerinden dersleri aldıktan sonraki, Moodle tecrübelerine bakıldığında ise, acemi (N=148 kişi) ve orta düzeyde (N=248 kişi) olduğu görülmüştür. Moodle üzerinden aldıkları dersler sorulduğunda ise üç-beş arası ders alan öğrencilerin 125 kişi olduğu, 5-8 arasında ders alanların sayısının ise 182 olduğu bulunmuştur.

Önerilen modelde yedi faktör bulunmaktadır Önerilen faktörlerin faktör yükleri ve güvenilirlik katsayıları alan yazında belirtilen kabul değerleri arasındadır. Modeldeki yedi faktörün birbirleriyle olan ilişkisinden dokuz tane hipotez geliştirilmiştir. Bu hipotezlerden birincisi teknik desteğin bilgisayar özyeterlilği üzerinde pozitif bir etkisi olduğu yönündedir. Verilerin analizi sonucunda önerilen bu hipotez desteklenmiştir. Buna göre, teknik destekte meydana gelen bir birimlik artış bilgisayar özyeterliliğin de 0,46'lık bir artışa neden olmaktadır. İkinci ve üçüncü hipotezde bilgisayar öz yeterliliğinin algılana kullanım kolaylığı ve algılanan fayda üzerinde pozitif bir etkisi olduğu öngörülmektedir. Buna göre, modelde önerilen bu iki hipotezde desteklenmiştir. Bilgisayar öz yeterliliği en çok algılanan faydayı daha sonra ise algılanan kullanım kolaylığını etkilemektedir. Dördüncü ve beşinci hipotez ise öğretim üyeleri için algılanan faydanın algılanan fayda ve davranışsal niyet üzerinde pozitif etkisi olduğu yönündedir. Ancak, öğretim üyeleri için algılanan faydanın algılanan faydayı etkilemediği bulunmuştur. Altıncı ve yedinci hipotezlerde, algılanan kullanım kolaylığının kullanıma yönelik tutum ve algılanan fayda üzerinde pozitif bir etkisi olduğu yönündedir. Buna göre, algılanan kullanım kolaylığındaki bir birimlik artış kullanıma yönelik tutumda 0,58'lik bir artışa neden olmaktadır. Sekizinci hipotez, algılanan faydanın kullanıma yönelik tutum üzerinde pozitif bir etkisi olduğu yönündedir. Bu hipotezde desteklenmiştir. Dokuzuncu hipotez, kullanıma yönelik tutumun davranışsal niyet üzerinde pozitif bir etkisi olduğu yönündedir. Buna göre kullanıma yönelik tutumda gerçekleşen bir birimlik artış davranışsal niyette 0,36 birimlik bir artışa neden olmaktadır. Modelde kullanıma yönelik tutumun % 48'ini algılanan kullanım kolaylığı ve algılanan faydanın açıkladığı görülmektedir. Ayrıca, bilgisayar öz-yeterliliği, öğretim üyeleri için algılanan fayda ve algılanan kullanım kolaylığı, algılanan faydanın %54'ünü açıklamaktadır.

Sonuç olarak, deprem gibi acil bir durumda üniversite öğrencilerinin Moodle'u ders yönetim sistemi olarak kullanmasını etkileyen faktörleri belirlemek amacıyla yapılan bu çalışmada sistemin kullanımında, algılanan kullanım kolaylığı, algılanan fayda ve tutumun etkili olduğu bulunmuştur. Ayrıca, bilgisayar öz yeterliliğinin, algılanan faydayı büyük oranda açıkladığı görülmektedir. Çalışmada desteklenmeyen tek hipotez öğretim üyeleri için algılanan fayda ile algılanan fayda arasındaki ilişkidir. Bunun nedeni, öğretim üyelerinin teknolojik araçların eğitimde kullanımına ilişkin yeterli bilgi sahibi olmaması gösterilebilir. Bir başka deyişle öğretim üyeleri Moodle'ı sadece ders notu yüklemek için kullanmışlardır buda öğrencide bu tür bir algıya neden olmuş olabilir. Teknoloji kabul modelinin deprem sonrasında kullanılan bir bilgi sisteminin kullanımını etkileyen faktörleri ortaya çıkarmada da etkili olduğu bu çalışmada teyit dilmiştir. Bu durumda, Moodle'un ders yönetim sistemi olarak acil durumlarda yararlanılabilecek bir ortam olduğu söylenebilir.

Citation Information

Kılıç, E. (2014). Determining the factors of affecting the moodle use by using tam. the story of a university after a destructive earthquake. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi [Hacettepe University Journal of Education]*, *29*(1), 169-179.