STUDENT BARRIERS TO ONLINE LEARNING AS PREDICTORS OF PERCEIVED LEARNING AND ACADEMIC ACHIEVEMENT

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ABSTRACT

This research investigates the effects of online learning barriers on students' perceived learning and academic achievement. In this study, the barriers identified by Muilenburg and Berge in 2005 were used as online learning barriers. These are (1) administrative issues, (2) social interaction, (3) academic skills, (4) technical skills, (5) learner motivation, (6) time and support for studies, (7) cost and access to the Internet, and (8) technical problems. In addition to online learning barriers, gender and job status are other variables of the study. The research was conducted with 622 online learning students and designed on a quantitative cross-sectional survey model. The analysis results show that gender and job status affect both academic achievement and perceived learning. In terms of students' online learning barriers, academic skills and learning motivation are predictors of academic achievement. In addition, academic skills and time and support for studies are predictors of perceived learning.

Keywords: Online learning, student barriers to online learning, perceived learning, academic achievement.

INTRODUCTION

The developments in technology have caused many changes in people's routines from shopping to eating and brought about radical changes in education. Some of these changes in education affected in-class practices, and some caused the instruction to move to different environments. Online learning is one of the best examples of these applications.

Online learning is applying online technologies that are considered to train a person (Horton, 2000). Learning online is encouraged and supported by online learning resources and components (Khan, 1997). In online learning, at least 80% of the learning content needs online presentation. (Allen, Seaman, Poulin&Straut, 2016). While online learning enables institutions and instructors to reach new learners at a distance, increases convenience, and expands educational opportunities (Hill, 2002; Hofmann, 2002; Schrum, 2000), it offers students such advantages as accessibility, flexibility, equality, collaboration, and active learning (Bennett & Bennett, 2002; Phipps &Merisotis, 2000; Hofmann, 2002). Online learning allows participants regardless of their age, gender and education level to participate in online learning activities, even those whose performance may be "restricted" by accessibility needs (Rizvi, Rienties& Khoja, 2019:32). It is widely accepted that online learning has significant advantages . Results of some research in the literature indicated that course design, interaction with course instructors, learner motivation, time management, and comfortableness with online technologies impact the success of online learning (Song, Singleton, Hill, &Koh, 2004; Swan, Shea, Fredericksen, Pickett, and Pelz, 2000).

Changing the primary learning environment and using online technologies in online learning have also brought about some barriers. These barriers, especially perceived by the students, negatively affect students' success in online learning. In the literature, it is possible to find many research on the negative aspects of online learning. It is seen that factors such as the necessity of having information about technology and how to use it, technical problems, a perceived lack of sense of community, time constraints, lack of academic and social support, lack of online learning readiness, feeling alone and isolated (Hillesheim, 1998; Song, Singleton, Hill &Koh, 2004; Vonderwell, 2003; Vonderwell& Zachariah, 2005; Woods, 2002; Stodel, Thompson & MacDonald, 2006; Maguire, 2005; Lloyd, Byrne & McCoy, 2012; Cho & Berge, 2002; Ali &Magalhaes, 2008; Simuth&Sarmany-Schuller, 2010; Horzum, DemirKaymak&CananGungoren, 2015; DemirKaymak&Horzum, 2013; Horzum, 2007) are considered as negative features.

Barriers to online learning have also been the subject of research in different cultures and at different levels of instruction. It is also observed that barriers to online learning vary across cultures (Horzum, DemirKaymak&CananGungoren, 2017). The problems commonly faced in online learning can be listed as follows; technical infrastructure needed for such an environment, the need to have knowledge and skills for the technology used, technical problems encountered, students' lack of readiness and feeling lonely in the absence of academic and social support for learning in a new environment (Broadbent, 2002; DemirKaymak&Horzum, 2013; Holmes & Gardner, 2006; Horzum, 2007; Horzum et al., 2015; Lynch, 2002; Simpson, 2002). Barriers encountered in such learning environments are commonly divided into two as student's barriers and institutional barriers (Hillesheim, 1998; Maguire, 2005). While numerous studies have discussed barriers to the successful implementation of distance education, many are based on examining instructor's experience, a distance learning environment, or a type of distance learning program (Muilenburg& Berge, 2001:7). Muilenburg and Berge (2005) conducted one of the most comprehensive studies summarizing the various study findings and parts on this topic. In the study, Muilenburg and Berge (2005) aimed to uncover the barriers online learners face as a crucial element of online learning. They explained the barriers to online learning using the eight-factor scale they developed. The eight factors were (a) administrative issues, (b) social interaction, (c) academic skills, (d) technical skills, (e) learner motivation, (f) time and support for study, (g) cost and access to the Internet, and (h) technical issues (Muilenburg& Berge, 2005). When the literature related to online learning barriers was examined, it was found that there was research addressing online learning barriers related to students and faculty and their impact or learning outcomes. However, there was not any quantitative study examining students' barriers to online learning and their impact on academic performance(objectively) and perceived learning (subjectively) at the same time as learning outcomes. Therefore, the current study considered online learning barriers including gender and occupation status and examined their impact on academic performance and perceived learning.

PURPOSE OF THE STUDY

This study aims to show how and to what extent students' perceived online learning barriers influence their learning. For this purpose, students' learning was examined by measuring perceived learning levels subjectively and with grade point average objectively. The study sought answers to the following two research questions;

1. Do student barriers to online learning, gender, and occupational status predict academic achievement?
2. Do student barriers to online learning, gender, and occupational status predict perceived learning?

METHOD

The current study was designed on a quantitative cross-sectional survey model. A cross-sectional survey, one of two main types of surveys, collects data to make inferences about a population (the universe) of interest at a given time (Lavrakas, 2008). Although the time required to collect all the data can take one day to several weeks or more, the information is only collected at one point in time (Fraenkel, Wallen, & Hyun, 2012). The current study used a cross-sectional survey model because it aimed to make inferences about a population of students in online learning at one point in time.

Participants

The participants of the research consisted of online learning students from a public university in Turkey. An online survey was prepared and sent to the students via their learning management system. Thus, an e-mail was sent to all the participants with information about the research and its purpose. In the e-mail, the students were asked to accept the link and fill out the form if they agreed to participate in the research. In this way, only voluntary students participated in the study. So convenience sampling was used in the research. 719 students responded to the survey. After examining the responses, 622 out of 719 questionnaires were used as valid for analysis. The sample of the research consisted of 622 online learning students studying in a public university in Turkey. 193 participants (31%) were college students, 268 participants (43,1%) were graduate students and 157 participants (25,2%) were postgraduate students. 235 students (37,8 %) were female, 383 students (61,6%) were male. 4 participants did not respond to these variables and left it blank. The students were between the age of 18 to 60 with the average age of 28.83. While 470 students (75,6 %) had a full-time job, 139 students (22,3 %) indicated that they were unemployed. 13 participants did not respond to this variable and left it blank.

Data Collection and Analysis

The Scale of Student Barriers to Online Learning (SSBOL)

In the current research, Turkish version of the scale "Student Barriers to Online Learning" (SSBOL) was used. SSBOL was developed by Muilenburg and Berge in 2005 and was adapted to Turkish by Horzum, DemirKaymak and CananGungoren (2017). SSBOL consists of 45 items as 1–5 Likert scale (from "no barrier" to "a very strong barrier," respectively) and eight factors. The eight factors are (1) administrative issues, (2) social interaction, (3) academic skills, (4) technical skills, (5) learner motivation, (6) time and support for studies, (7) cost and access to the Internet, and (8) technical problems. Internal consistency Cronbach's Alpha coefficient of the scale was found α =.96 in the current study.

Perceived Learning Scale

The Perceived Learning Scale (PLS) was developed by Rovai, Wighting, Baker and Grooms (2009). The scale was adapted to Turkish by Albayrak, CananGungoren and Horzum (2014). In this research, Turkish version of PLS was used. The scale consisted of 9 Likert items and three factors. The factors of the scale are cognitive, affective and psychomotor. This scale can be used as one factor with the total score. In the current study, it was used with a single total score. The internal consistency Cronbach's Alpha coefficient of the scale was found α =.86 in the current study.

Other Variables

In this study, gender, job status and academic achievement were postulated as other variables. Each one of these variables was included in the questionnaire as questions. As for academic achievement, participants were asked "what is your last GPA?". Students answered the question by writing their grade points on their transcripts and GPA scores were used as a 4.0 scale.

Procedure

To collect data, the scales were converted to an online survey form and after obtaining the necessary permission from Distance Education Centre of the university, the link for the survey was sent to the students by e-mail. Participation was voluntary and the participants were kept anonymous. For the validity and reliability of the study, submitted answers with proven validity and reliability were used in the study. Incomplete or incorrectly filled forms were not included in the analysis.

For the statistical analyses, correlations and linear regressions were used to evaluate how well online learning barriers, gender and job status predicted achievement and perceived learning. For the assumptions of the regression analysis, the Durbin–Watson, VIF and Tolerance values were examined. Durbin–Watson value was found to be 1.738 in the research. Moreover, tolerance values ranged from .373 to .923, and VIF values range from 1.083 to 2.684. Durbin–Watson value was close to 2, and nonautocorrelation between variables is indicated. All tolerance values are greater than .20 and VIF values are less than 5; no multicollinearity problem is indicated. In addition, the skewness and kurtosis values for the continuous variables in the study ranged from -1 to 1. These analyses were conducted using SPSS 21.

FINDINGS

Participants' perceived learning scores ranged from 9 to 45 (± SD; 30.75±5.10), and academic achievement scores ranged from 0,33 to 4 (± SD; 2.19±0.79). For the factors of student barriers to online learning; the scores of Administrative Issues (AII) ranged from 11 to 55 (± SD; 29.11±10.52), the scores of social interaction (SI) ranged from 6 to 30 (± SD; 14.23±5.69), the scores of academic skills (AS) ranged from 6 to 30 (± SD; 11.43±5.91),the scores of technical skills (TS) ranged from 6 to 30 (± SD; 10.31±5.58), learner motivation scores (LM) ranged from 5 to 25 (± SD; 11.25±5.14), scores of time and support for studies (TSS) ranged from 5 to 25 (± SD; 11.83±5.33), scores of cost and access to the Internet (CAI) ranged from 3 to 15 (± SD; 6.47±3.41), scores of technical problems (TP) ranged from 3 to 15 (± SD; 7.28±3.62). . Table 1 presents the means and standard deviations of the factors of students' barriers to online learning that are administrative issues (AII), social interaction (SI), academic skills (AS), technical skills (TS), learner motivation (LM), time and support for studies (TSS), cost and access to the Internet (CAI), technical problems(TP) together with cumulative grade score (CGP) and perceived learning (PerL).

Pearson's correlations were used to assess the bivariate relationships between online learning barriers scores and academic achievement and perceived learning. There is no significant correlation between the barriers to online learning and academic achievement and perceived learning (see Table1). While academic achievement has the highest correlation with learner motivation (-0,223), and the lowest correlation with technical problems (-0,048), perceived learning has the highest correlation with academic skills (-0,305) and the lowest correlation with technical problems (-0,223).

Table 1. Pearson's correlations between student barriers to online learning, cumulative grade scores and perceived learning.

	AII	SI	AS	TS	LM	TSS	CAI	TP	CGP	PerL
AII	1	,595**	,417**	,385**	,462**	,458**	,405	,562**	-,054**	-,212**
SI		1	,516**	,402**	,558**	,512**	,434**	,490	-,106**	-,245**
AS			1	,737**	,627**	,519**	,582**	,456**	-,204	-,305**
TS				1	,626**	,519**	,638**	,463**	-,147**	-,233
LM					1	,601**	,544**	,473**	-,223**	-,268**
TSS						1	,593**	,532**	-,165**	-,285**
CAI							1	,632**	-,144**	-,204**
TP								1	-,048**	-,190**
CGP									1	,206**
PerL										1
M	29,11	14,24	11,4357	10,3119	11,2524	11,8328	6,4743	7,2862	2,1984	31,0213
SD	10,53	5,70	5,91553	5,58891	5,14294	5,33976	3,41567	3,6225	0,79893	4,6309

*Note. Asterisks indicate significant correlations: * p < .050, ** p < .010; AII= Administrative Issues, SI= social interaction, AS= academic skills, TS= technical skills, LM= learner motivation, TSS= time and support for studies, CAI= cost and access to the Internet, TP= technical problems, CGP= cumulative grade scores average, PerL= Perceived Learning, , M = Mean, SD = Standard deviation.*

After investigating correlations, two separate linear hierarchical regression analyses were performed in which the variables of academic achievement and perceived learning were taken as dependent variables.

Firstly, a multiple linear hierarchical regression analysis was conducted to evaluate how well the variables predicted academic achievement scores. The regression model contained gender, job status and online learning barriers factors scores as predictors of academic achievement scores. In hierarchical regression, the first block consisted of gender and job status, and the second block was student barriers to online learning—the result of this analysis is presented in Table 2.

Table 2. Hierarchical Regression analysis with academic achievement as the outcome variable and student barriers to online learning, gender and job status as predictor variables.

Predictor	B	S. E.	Beta	T	Significance
Block 1 ($R2 = 0 , 036$; $\Delta R2 = 0,032$; $F(521) = 9,751$; $p. < 0.001$)					
Gender	**-,284**	**,074**	**-,171**	**-3,823**	**0.000**
Job status	**0,269**	**0,084**	**0,143**	**3,184**	**0,002**
Block 2 ($R2 = 0 ,102$; $\Delta R2 = 0,084$; $F(513) = 4,673$; $p. < 0.001$)					
Gender	**-0,289**	**0,073**	**-0,174**	**-3,946**	**0.000**
Job status	**0,245**	**0,083**	**0,13**	**2,941**	**0,003**
AII	0,004	0,004	0,052	0,936	0,350
SI	0,006	0,008	0,044	0,753	0,452
AS	**-0,02**	**0,009**	**-0,143**	**-2,116**	**0,035**
TS	0,012	0,01	0,084	1,229	0,220
LM	**-0,028**	**0,01**	**-0,177**	**-2,807**	**0,005**
TSS	-0,011	0,009	-0,075	-1,272	0,204
CAI	-0,017	0,015	-0,071	-1,096	0,274
TP	0,019	0,013	0,085	1,439	0,151

Note. Predictors were entered in two steps. In step 1, gender and job status and in step 2, factors of student barriers to online learning were entered. Gender: 0= female, 1=male; Job status: 0= Unemployed, 1= Full-time. AII= Administrative Issues, SI= social interaction, AS= academic skills, TS= technical skills, LM= learner motivation, TSS= time and support for studies, CAI= cost and access to the Internet, TP= technical problems.

In the first block, F was significant between academic achievement and gender and job status. : F change (521) = 9,751, $p < .001$, R2 change = 0,036. The second block's F change was significant and R2 change increased compared to the previous block: F change (513) = 4,673, $p < .001$, R2 change = 0,065. In the second block, gender, job status, academic skills and learner motivation were significant predictors of academic achievement.

There is a significant effect of gender on academic achievement. Females have higher achievement scores than males. As gender does, job status also has a significant impact on academic achievement. Students that are employed have higher achievement scores. The second block of the analysis shows that academic skills and learning motivation significantly affect academic achievement. It does mean that students who have less barriers to academic skills and learning motivation are more successful. Besides, other online learning barrier factors were not significant predictors of academic achievement.

Secondly, perceived learning for online learning was analyzed with a hierarchical regression model as a dependent variable. In the first block, gender and job status were analyzed. In the second block, student barriers to online learning were examined as predictors of perceived learning.

Table 3 presents hierarchical regression analysis with perceived learning as a dependent variable and gender, job status and factors of student barriers to online learning as predictor variables.

Table 3. Hierarchical Regression analysis with perceived learning as an outcome variable and student barriers to online learning, gender and job status as predictor variables.

Predictor	B	S. E.	Beta	T	Significance
Block 1 ($R2 = 0,034$; $\Delta R2 = 0,031$; $F(592) = 10,393$; $p. < 0.001$)					
Gender	-0,864	0,406	-0,09	-2,130	0,034
Job status	2,109	0,470	0,190	4,489	0,000
Block 2 ($R2 = 0,152$; $\Delta R2 = 0,137$; $F(584) = 10,150$; $p. < 0.001$)					
Gender	-1,084	0,391	-0,113	-2,772	0,006
Job status	1,836	0,448	0,166	4,093	0,000
AII	-0,015	0,023	-0,034	-0,664	0,507
SI	-0,023	0,044	-0,028	-0,531	0,596
AS	-0,160	0,048	-0,201	-3,303	0,001
TS	0,018	0,052	0,021	0,342	0,732
LM	-0,035	0,052	-0,038	-0,669	0,504
TSS	-0,152	0,047	-0,173	-3,213	0,001
CAI	0,047	0,081	0,034	0,578	0,563
TP	0,017	0,071	0,013	0,235	0,815

Note. Predictors were entered in two steps. In step 1, gender and job status and in step 2, factors of student barriers to online learning were entered. Gender: 0= female, 1=male Job status: 0= Unemployed, 1= Full-time. AII= Administrative Issues, SI= social interaction, AS= academic skills, TS= technical skills, LM= learner motivation, TSS= time and support for studies, CAI= cost and access to the Internet, TP= technical problems.

In the first block, F was significant between gender and job status: F change (592) = 10,393, $p < .001$, R2 change = 0,034. The second block's F change was significant and R2 change increased compared to the previous block: F change (584) = 10,150, $p < .001$, R2 change = 0,152. In the second block, gender, job status, academic skills, time, and support for studies were significant predictors of perceived learning.

According to the results of analyzing, gender has a significant effect on perceived learning. Females have higher perceived learning scores than males. Job status also has a significant impact on perceived learning. Students who are employed have higher scores of perceived learning than unemployed students. In the second block of the analysis, it was found that academic skills, and time and support for studies have a significant effect on perceived learning. It can be seen in Table 3 that students who have less barriers of academic skills, and time and support for studies have higher perceived learning scores. Besides, other online learning barrier factors were not significant predictors of perceived learning.

DISCUSSIONS AND CONCLUSION

Results of the research show that gender and occupational status are predictors of learning, as both academic achievement and perceived learning. Most research show that females outperform males in school (Zembar& Blume, 2011). On the contrary of face to face learning, in online learning, many researchers have mentioned that there is no statistically significant mean difference between genders in terms of achievement (Lu, Yu & Liu, 2003; Ory, Bullock & Burnaska,1997; Sierra & Wang, 2002; Yukselturk&Bulut, 2007; Yukselturk&Bulut, 2009; Yukselturk& Top, 2013). Several researchers found that female and male students experience online environment differently, and gender was reported as a significant variable (Caspi, Chajut&Saporta, 2008; Yukselturk&Bulut, 2009; Nistor&Neubauer, 2010; Nistor, 2013; Yukselturk& Top, 2013; Wladis, Hachey& Conway, 2015; Cai, Fan & Du, 2017). Astleitner and Steinberg's (2005) research suggested that gender effects are insignificant at all levels of the postulated model. Nevertheless, in the current study, gender was found to be a significant variable for achievement . Females have higher scores than males. So, the current study is not consistent with the literature claiming that females are more successful than males. There could be different reasons for this. The first is measurement of the academic achievement by survey instudents. Students were asked what their final GPA was. But achievement scores are not checked to see if students' overall total scores are true or not because research capabilities do not allow it. Moreover, in Turkey, exams in online learning are generally administered in multiple-choice format and scored.. Sufficient time is required to master multiple-choice tests used for lower-order skills. The percentage of unemployed females among the participants of the current research is much higher than that of males. This implies that females could devote more time to study. In this regard, it is expected that females who have a high level of perseverance will be more successful. Nevertheless, it could be emphasized that the need for future studies is foreseen for gender and achievement. In addition, more in-depth studies could be conducted on the source of gender finding in achievement

In terms of perceived learning, gender was found to be a significant value for perceived learning in this study. As in their study, Rovai and Baker (2005) mentioned that females had a higher perceived learning level than males.

Yukselturk and Top (2013) emphasized that learners' occupational status is a significant input characteristic for online learning, like gender. Lu, Yu and Liu (2003) could not find significant results on job status in web based learning in their research. On the other hand, job status was found to be a predictor of academic achievement and perceived learning. In this research, this interesting result shows that students who are employed learn more. The choice of online education can be explained as people have a job so they cannot receive face-to-face education. For that reason, they can be making more efforts to be more successful.

In examining the influence of barriers to online learning on academic achievement, it was found that barriers related to academic skills and learning motivation were predictors of academic achievement in online learning. Barriers related to administrative issues, social interaction, technical skills, time and support for studies, cost and access to the internet and technical problems were not found as predictors of academic achievement in online learning. The relationship between barriers students face in online learning and perceived learning achievement was analyzed. Barriers related to cademic skills, and time and support for study were found to significantly influence perceived learning. Student barriers other than academic skills, and time and support for study were not observed as predictors of perceived learning.

Results on student barriers to online learning indicate that students who have fewer barriers related to academic skills, are more successful in academic achievement and perceived learning. Those with fewer barriers related to academic skills were more successful in terms of learning. Academic skills influence achievement and perceived learning.

Student barriers to learning motivation on online learning have been found as predictors of academic achievement. Many studies indicate that learning motivation affects achievement (Brophy, 2010; Hudley& Gottfried, 2008; Schunk, 2007). Many studies also indicate that learning motivation affects achievement, especially in online learning (Merisotis& Phipps, 1999; Moore &Kearsley, 2012). This result is consistent with the literature.

Finally, barriers related to time and support for studies were found as a predictor of perceived learning. Perceived learning is a subjective indicator of learning, and barriers related to time and support for studies are related to how we perceive environmental factors. For that reason, students' perceptions of environmental factors (time, family, social, etc.) determine their perceived learning levels.

The study results indicated that gender and job status are predictors of both academic achievements and perceived learning. On the other hand, when student barriers to online learning as predictors were investigated, it was indicated that barriers related to academic skills are one of the predictors of both academic achievements and perceived learning, learning motivation is one of the predictors of academic achievement, and lastly barriers related to time and support for studies is one of the predictors of perceived learning.

Based on the study's conclusions, it could be recommended that future studies investigate student barriers to online learning with other dependent and independent variables or investigate these barriers with the same variables by measuring different instruments or gathering data from different students. Besides, the current study has some limitations about the nature of the study, participants and instruments. The first limitation is about the academic achievement variable. It was surveyed with one question "what is your latest GPA?". It could be measured with an achievement test or identified as details with transcripts. But it was preferred because of the difficulty of implementing achievement tests online and getting personal information. Another limitation is including variables to analyse barriers to online learning. The current gender and job status were included; it could be other variables that affect online learning barriers. For future studies, different variables could be investigated. The last limitation is how the perceived learning scale was used. Factors of perceived learning scale were not used one by one; it was used as one factor with the total score.

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