

Students' Barriers and Emotional Presence in Online Learning: A Canonical Correlation Analysis

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Abstract: Addressing the barriers students face in online learning is critical to creating an inclusive, supportive, and practical educational experience that benefits many students. The aim of this study is to examine students' online learning barriers and emotional presence, which affect many variables in online learning environments, and the relationship between these variables. For this purpose, data was collected from 402 university students enrolled in the same course at a university. According to the data collected from the students, it can be said that the student's barriers to online learning are at a medium level for eight sub-factors ((a) administrative issues, (b) social interaction, (c) academic skills, (d) technical skills, (e) learner motivation, (f) time and support for studies, (g) cost and access to the Internet, and (h) technical problems). Similarly, it was found that students' emotional presence in online learning is at an average level for Receiving Emotions ($\bar{x}=3,438$) and Giving Emotions ($\bar{x}=2,994$) factors. Canonical correlation analysis was used to show the relationship between student barriers and emotional presence. As a result of this analysis, it was concluded that the canonical correlation was low. It was observed that the factor that contributed the most to the significant model among student barriers was the factor of administrative/instructor issues, and the factor of receiving emotions factor was one of the emotional presence factors.

Keywords: Online Learning, Student Barriers, Emotional Presence

1. Introduction

The use of computer-based multimedia educational technologies, which are gradually replacing traditional face-to-face learning environments, is increasing, which can cause various emotional experiences in students (Tyng et al., 2017). Emotions are known that have a significant impact on learning (Antonacopoulou & Gabriel, 2001; Pekrun, 2000; Linnenbrink-Garcia & Pekrun, 2011). Likewise, in e-learning, emotions are positioned as central and necessary in the teaching/learning process (O'Regan, 2003). This is because those engaged in online learning deal with the effects of emotions on a daily basis, whether they are designing instruction, teaching or learning online (Cleveland-Innes & Campbell, 2012). While emotions have long been a subject of interest in educational settings, the evolution of technology has not only transformed the nature of learning environments but also reshaped our understanding of emotions within these contexts (Sarsar & Kışla, 2016). Emotions are also stated to have an important role in students' adaptation to the online learner role (Cleveland-Innes et al., 2007). When a person feels emotionally intelligent during e-learning, it means that he/she perceives a high level of emotional presence (Kang, Kim & Park, 2007). Therefore, emotional presence is one of the issues that should be taken into consideration in e-learning environments.

Presence is one of the concepts discussed and studied in e-learning. The community of inquiry model is a well-known theory and widely used in online learning researches. The community of inquiry model comprises three key components: cognitive presence, social presence, and teaching presence (Garrison, Anderson, & Archer, 2000). In the Community of Inquiry model, emotional presence is understood in terms of emotional expression which is part of social presence (Garrison, Anderson, & Archer, 2010;

Majeski et al., 2018). Emotional presence is the outward expression of emotion, affect, and feeling by individuals and among individuals in a community of inquiry, as they relate to and interact with the learning technology, course content, students, and the instructor (Cleveland-Innes & Campbell, 2012: p.283). Kang, Kim and Park (2007) stated that social presence is based on the perception of *ad hominem* and emotional presence is based on individual perception for that reason emotional presence could be separated and defined as an independent area not as sub-element of social presence. It has been pointed out that the role of emotional presence includes motivational and emotional experiential elements such as self-efficacy and openness, thus going beyond emotional expression in learning (Majeski et al., 2018). Stenbom, Hrastinski, and Cleveland-Innes (2016) provided evidence in their research that emotional presence exists in an online relationship of inquiry, and emotional presence can be measured outside of social presence. Dell (2021) stated in her doctoral thesis on emotional presence in the inquiry community that he could find only eight studies on emotional presence and that further studies on this subject are needed. Her findings support that emotional presence is important for trust and belonging and is implicated in deep and meaningful learning.

Students' perceptions of online learning are one of the important factors affecting learning outcomes (Demir Kaymak & Horzum, 2013; Horzum, 2015; Horzum et al., 2015). In this respect, outputs such as high dropout rates, low motivation, negative attitudes, etc. in online learning can be caused by negative perceptions such as wrong design and disruption of the process. One of these perceptions is perceived barriers (Mulenburg & Berge, 2005).

The barriers perceived by students in online learning affect students' success (Demir Kaymak & Horzum, 2013; Horzum, 2015; Horzum et al. 2015; Horzum et al. 2017). In addition, online learning barriers are related to academic motivation (Kongül and Toprak, 2023), perception of transactional distance (Akpınar, 2019), perception of social presence (Seferoğlu, Doğan and Duman, 2011), and attitudes towards online learning (Sipahi, 2019), readiness for online learning (Horzum, 2019), Ability and confidence in online learning technology (Mulenburg and Berge, 2005), Effectiveness in online learning, and Enjoyment of online learning (Mulenburg and Berge, 2005), Number of completed online courses (Mulenburg & Berge, 2005) and the possibility of taking online courses in the future (Mulenburg & Berge, 2005). When the literature was examined, it was seen that no study simultaneously addressed students' emotional presence in online learning and perceived barriers to online learning, affecting their success. When the literature was examined, it was seen that no study simultaneously addressed students' emotional presence in online learning and perceived barriers to online learning, affecting their success. Within the scope of this research, the following research questions were examined.

- How is the student barriers to online learning?
- How is the students' perceived emotional presence in online learning?
- What is the relationship between factors of perceived students' barriers to online learning and emotional presence?

2. Method

2.1. Research design

Since the research aims to examine the relationship between student barriers and students' emotional presence in online learning, the research was conducted as a correlational research. Correlational research is research in which the relationship between two or more variables is investigated without interfering with these variables in any way (Büyüköztürk et al., 2023). correlational research is a type of nonexperimental research that facilitates prediction and explanation of the relationship among

variables (Tan, 2014:176). There are two types of correlational research: exploratory and predictive correlational research (Fraenkel & Wallen, 2006). This study is designed as exploratory correlational research.

2.2. Participants

The accessible population of the study consists of students taking online courses at a state university in Türkiye. Convenient sampling method was used as the sampling method and the students who voluntarily participated in the study were included. In order to prevent the participants' views from being affected by the characteristics such as the institution, department or environment providing online learning, students enrolled in the same education were studied. For this purpose, students who received pedagogical formation education online in the 2022-2023 academic year were studied. The questionnaires were sent to the students online and 409 participants returned the questionnaire forms. When the forms were examined, 7 forms were removed because they were not filled in properly, and the data obtained from the remaining 402 participants were analyzed. Demographic information about 402 participants is given in Table 1.

Table 1

Demographic Information of Participants

Gender	N	%
Male	62	15,4
Female	340	84,6
Total	402	100.0
Age	N	%
20-24	199	49,5
25-29	89	22,1
30-34	39	9,7
35-39	37	9,2
40 and over	28	7,0
Total	447	100

As seen in Table 1, the majority of the participants are female students (340) and students between the ages of 20-24 (199).

2.3. Data collection tool

In the study, the Student Barriers to Online Learning Scale and the Emotional Burdensomeness in Online Learning Environments Scale were used as data collection tools.

2.3.1. The student barriers to online learning scale

The Student Barriers to Online Learning Scale developed by Muilenburg and Berge in 2005 is a 5-point Likert-type scale consisting of 45 items and 8 factors ((a) administrative issues, (b) social interaction, (c) academic skills, (d) technical skills, (e) learner motivation, (f) time and support for studies, (g) cost and access to the Internet, and (h) technical problems). The Turkish version of the scale adapted by

Horzum et al. (2017) was used in this study. *“Lack of timely feedback from instructor”, “Lack of social context cues”* and *“Lack support from family, friends, employer”* are examples of scale items. Cronbach's alpha value for the scale was .92. Cronbach's alpha values for sub-factors are between .82 and .94.

2.3.2. The emotional presence in online learning scale

In order to examine students' emotional presence, the Emotional Presence Scale in Online Environments developed by Sarsar and Kışla (2016) was used. The scale consists of 2 factors as (a) receiving emotions and (b) giving emotions and 21 items in 5-point Likert type. *“I have difficulty expressing my feelings in virtual environments”* item is an example of the Giving Emotion factor. *“I pay attention to the emotions of the people I communicate with in virtual environments”* item is an example of the Receiving Emotion factor. The Cronbach alpha of the scale was .88. The Cronbach alpha of factors, the Giving Emotion factor was .79 and the Cronbach alpha of the Receiving Emotion factor was .86.

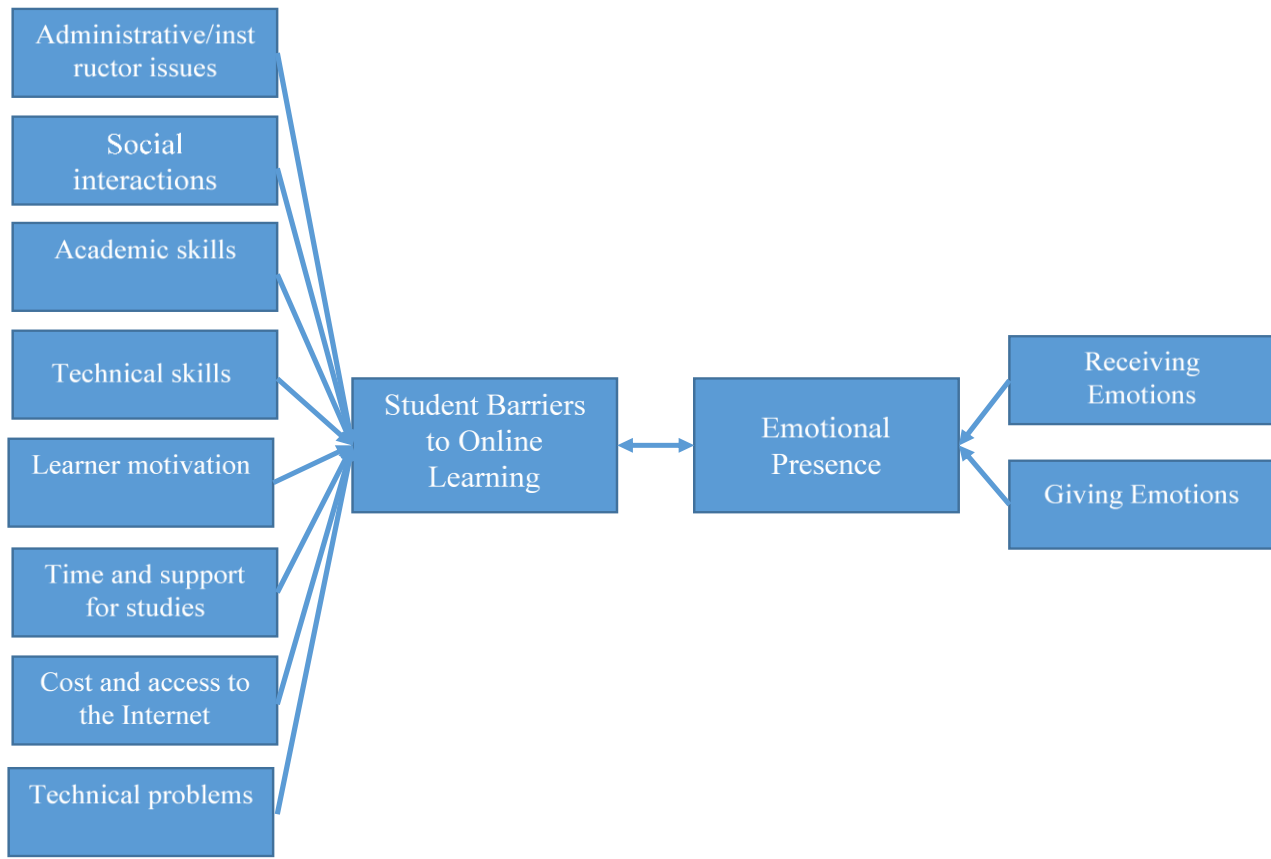
2.4. Data collection and analysis

The data were collected from the participants with the help of an online questionnaire. The link to the scales was sent to all students enrolled in the course. Participants who voluntarily participated in the study were included in the study. SPSS 26.0 package program was used for data analysis. Since there were two or more factors for student barriers in online learning and emotional presence in online learning environments, canonical correlation analysis was used to examine the relationship between these variables.

Canonical correlation analysis is used to find the relationships between two data sets, each consisting of at least two variables (Tabachnick, & Fidell, 2013; Weenink, 2003). Canonical correlation analysis was preferred to be used in this study since canonical correlation analysis tests whether two sets of variables obtained from the same individual or situation are independent of each other and determines the variables in both sets that contribute the most to the correlation between the sets (Çemrek, 2012). Canonical correlation analysis, a widely utilized multivariate statistical method, is favored among researchers due to its versatility in handling both metric and non-metric data, with the added benefit that neither variable set needs to be strictly dependent or independent (Menevşeoğlu, 2019). The variable groups whose relationships were analysed by canonical correlation analysis in this study are shown in Figure 1.

Figure 1

Variables and general structure of the research



For canonical correlation, firstly, the prerequisites of the analysis were examined. These conditions are linearity, multivariate normal distribution, and no multicollinearity between variables (Tabachnick, & Fidell, 2013). For multicollinearity, correlation values between variables were examined, and since these values were below 0.80 (Berry & Feldman, 1985), it was accepted that this assumption was met. Skewness and kurtosis values were examined to examine the normality of the data. Since these values are between -1 and +1 (Hair et al, 2013), it is accepted that the normality assumption is met. VIF values were analyzed for the multicollinearity assumption, and the highest value was found to be 2.86. VIF values of 5 and below indicate that this assumption is met, according to Craney and Surles (2002). In addition, the sample size should be as large as possible regarding the results' reliability. Keskin and Özsoy (2004) stated that this size should be at least 5 times the number of variables, and Stevens (2009) stated that it should be 10 or 20 times the number of variables. In this study, a total of ten variables, eight for barriers to online learning and two for emotional presence, were used, and 402 participants were studied. This shows that the sample size is quite sufficient for canonical correlation analysis.

2.5. Ethical principles

Ethics committee permission was received from Sakarya University Rectorate Ethics Committee with the decision dated 09.11.2022 and numbered 12/19.

3. Findings

3.1. Student barriers to online learning and emotional presence

Descriptive statistics of students' perceived barriers to online learning and emotional presence are presented in Table 1. According to the descriptive statistics based on the mean scores, students' mean

scores for (a) administrative/instructor issues in online learning ($\bar{X}=3,18$), (b) social interactions ($\bar{X}=2,68$), (c) academic skills ($\bar{X}=2,78$), (d) technical skills ($\bar{X}=2,86$), (e) learner motivation ($\bar{x}=3,08$), (f) time and support for studies ($\bar{X}=2,75$), (g) cost and access to the internet ($\bar{X}=3,11$) and (h) technical problems ($\bar{X}=3,23$) are evaluated as moderate. According to these values, it can be said that the factor with the highest perceived barrier is technical problems ($\bar{X}=3,23$) and the factor with the lowest perceived barrier is social interactions ($\bar{X}=2,68$). On the other hand, for emotional presence, the average for the Receiving Emotions factor was found to be $\bar{X}=3,43$, while it was found to be $\bar{X}=2,99$ for the Giving Emotions factor.

Table1

Descriptive Statistics of Student barriers to online learning and Emotional Presence

		N	Min	Max	Mean	SD
Student barriers to online learning	Administrative/instructor issues	402	1,00	5,00	3,1827	,86518
	Social interactions	402	1,00	5,00	2,6874	1,08377
	Academic skills	402	1,00	5,00	2,7832	1,10437
	Technical skills	402	1,00	5,00	2,8672	,94632
	Learner motivation	402	1,00	5,00	3,0879	,85440
	Time and support for studies	402	1,00	5,00	2,7542	,91444
	Cost and access to the Internet	402	1,00	5,00	3,1177	1,07798
	Technical problems	402	1,00	5,00	3,2305	1,10689
Emotional Presence	Receiving Emotions	402	2,00	4,92	3,4384	,51045
	Giving Emotions	402	1,89	4,33	2,9947	,43109

3.1.1. Correlations between student barriers to online learning and emotional presence

The correlation values between student barriers and emotional presence factors are given in Table 2. According to this table, the correlation values in terms of student barriers and emotional presence vary between the lowest,024, and the highest,170. These values show a low correlation.

Table 2

Correlation between the sub-dimension of Student barriers to online learning and Emotional Presence (n = 402).

	X1	X2	X3	X4	X5	X6	X7	X8	Y1	Y2
Administrative /instructor issues	1	,497**	,550**	,550**	,567**	,509**	,584**	,470**	,170**	,035
		,000	,000	,000	,000	,000	,000	,000	,001	,483
Social interactions		1	,713**	,553**	,310**	,720**	,536**	,559**	,075	,107*
			,000	,000	,000	,000	,000	,000	,132	,033
Academic skills			1	,570**	,418**	,627**	,523**	,560**	,024	,097
				,000	,000	,000	,000	,000	,638	,053
Technical skills				1	,454**	,626**	,622**	,667**	,115*	,111*
					,000	,000	,000	,000	,021	,026
Learner motivation					1	,448**	,428**	,304**	,080	,068
						,000	,000	,000	,107	,175
Time and support for studies						1	,549**	,556**	,051	,065
							,000	,000	,307	,191
Cost and access to the Internet							1	,721**	,088	,016
								,000	,078	,745
Technical problems								1	,033	,069
									,509	,168
Receiving Emotions									1	,392**
										,000
Giving Emotions										1

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

*Correlation is significant at the 0.05 level (2-tailed).

For canonical correlation analysis, X variable block (X1=Administrative/instructor issues, X2= Social interactions, X3 =Academic skills, X4= Technical skills, X5= Learner motivation, X6= Time and support for studies, X7= Cost and access to the Internet, X8= Technical problems) represents student barriers and Y block (Y1= Receiving Emotions, Y2= Giving Emotions) represents emotional presence factors. Only one of the two correlation values was calculated as a result of canonical correlation analysis to examine the relationship between student barriers and students' perceived emotional presence in online learning was found to be statistically significant. The Wilks Lambda coefficient for the canonical correlation between the two groups of variables was 0.918 ($F = 2.144$, $p < 0.05$), and the canonical correlation coefficient was 0.237; however, this indicates a low effect size. According to this model, the equations for student barriers and emotional presence are as follows.

$$\text{Student Barriers (X)} = -1,052_{X1} - 0,145_{X2} + 0,715_{X3} - 0,266_{X4} + 0,237_{X5} + 0,119_{X6} - 0,440_{X7} + 0,556_{X8}$$

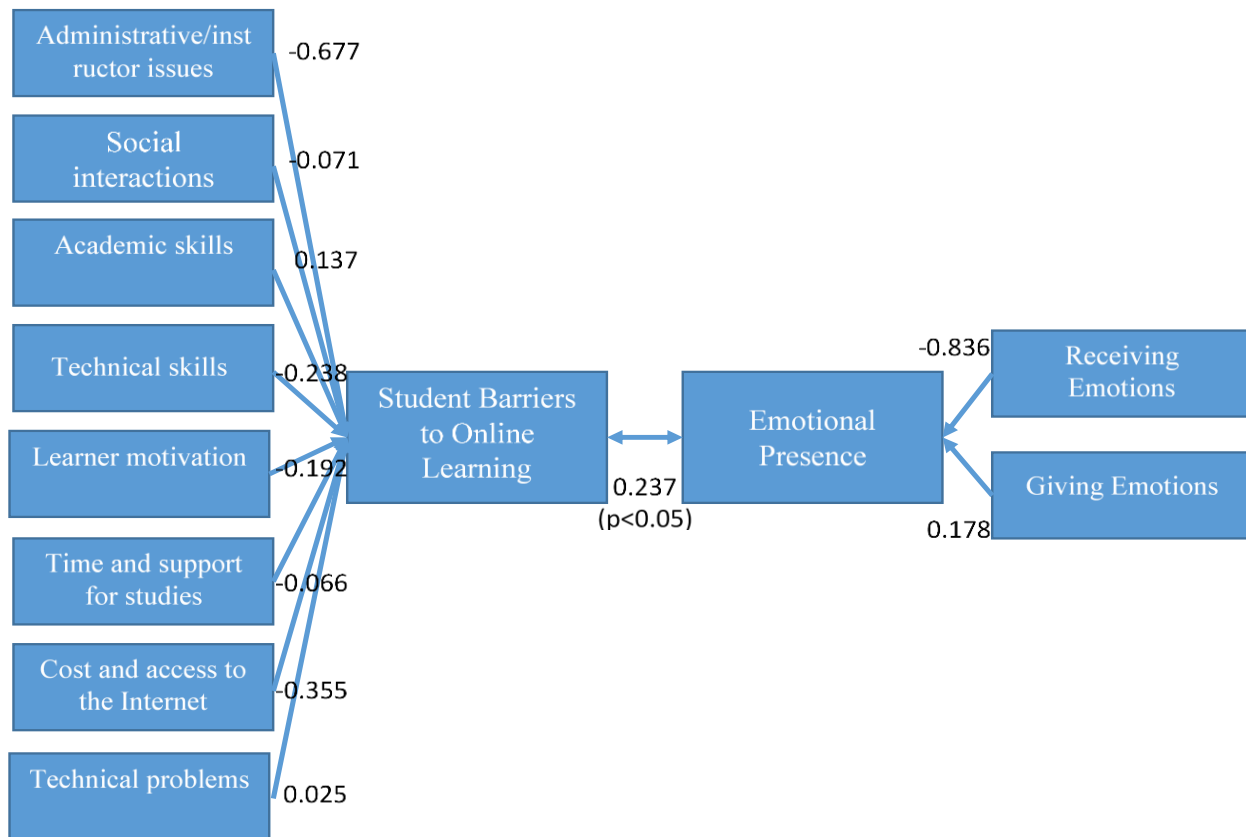
$$\text{Emotional Presence (Y)} = -1,069_{Y1} + 0,597_{Y2}$$

The canonical loadings of the variables are given in Figure 2. When these values are examined, it is seen that the factor with the highest canonical load value on student barriers is the factor of

administrative/instructor issues ($R_s=-0.677$) and the factor of receiving emotions ($R_s=-0.836$) on emotional presence.

Figure 2

Structure coefficient of canonical factors



In addition, when the cross-loadings showing the effect of student barriers factors on emotional presence were examined, it was found that the factor with the highest effect was administrative /instructor issues (-0.161), and the others as social interactions (-0.017), academic skills (0.032), technical skills (-0.057), learner motivation (-0.046), time and support for studies (-0.016), cost and access to the internet (-0.084), technical problems (0.006). When the effect of emotional presence factors on student barriers was analysed, the highest factor of receiving emotions (-0.198) and and then the factor of giving emotions (0.042) were found.

4. Results and Discussion

This study analyzed student barriers to online learning and students' emotional presence. The barrier levels perceived by the students has been examined as administrative/instructor issues, social interactions, academic skills, technical skills, learner motivation, time and support for studies, cost and access to the internet and technical problems. The average scores calculated for student barriers can be considered moderate. This finding is similar to the studies in the literature (Akpınar, 2019; Aljaraideh, & Al Bataineh, 2019; Horzum, 2019; Srichanyachon, 2014) in which the barriers perceived by students in online learning are generally moderate. On the contrary, there are also sources indicating that students encounter significant online barriers (Sipahi, 2019) or that lower average scores are obtained for barriers (Muilenburg & Berge; 2005).

The three factors that received the highest scores for the barriers addressed in this study were factors of administrative/instructor issues, cost and access to the internet, and technical problems. On the other hand, Muilenburg and Berge (2005) found that Social interactions, Administrative/instructor issues, and Time and support for studies were the factors with high scores. In another study on online learning barriers, it was stated that Social interactions, Time and support for studies factor were perceived as a barrier, while administrative and instructor issues, academic skills, student motivation, internet access and support provider, technical skills, cost and access to the internet were not perceived as barriers (Canan-Güngören et al, 2019).

According to research results, it can be said that students' emotional presence in online learning is at an average level for receiving emotions and giving emotions factors. Similar results were found in the study conducted by İlgar et al. (2022) with university students.

Finally, when the relationship between student barriers and emotional presence in online learning was examined, a statistically significant but low-level relationship was found. In the literature, there are sources (Akpınar, 2019; Seferoğlu, Doğan, & Duman, 2011) that mention the relationship between barriers and social presence in online learning and its importance, but there are no studies on the relationship between students' barriers and emotional presence. Administrative/instructor issues factor among student barriers was found to have an effect on both student barriers and emotional presence.

4.1. Limitations of the study

One of the most important limitations of this study is participants. Although this study was conducted with students who received the same online education at the same university, most of the students' education before this education was face-to-face in a similar group. Although there are students from 14 different departments among the 402 participants in the research, the rate of students knowing the students from their previous classes in this education is high. Due to this, students may also be carrying the effects of face-to-face training, although they received their training completely online during the application. For example, the fact that the factor perceived as the lowest obstacle in student barriers is social interaction may be due to this. In addition, the data collection tools used in the study can also be considered as a limitation of the study. To obtain more detailed data for student barriers, a scale with more items and widely used in studies (Muilenburg & Berge; 2005) was preferred. For emotional presence, the only scale that has been studied on this subject was used.

4.2. Recommendations

According to the results obtained from the research, studies can be carried out to reduce perceived barriers, primarily on administrative/instructor issues, in order to contribute to students' emotional presence levels. Administrative and instructors can be trained, and support systems can be prepared in order to reduce perceived barriers of this issue. Psychological support can be provided to students who have problems with receiving emotions, which has more impact.

For future research, it can be suggested to increase the number of studies to be conducted on emotional presence. In addition, similar research hypotheses can be tested with different measurement tools and different participants. Thus, the effect of the limitations of the research can be examined. In addition, qualitative research can be organized to obtain more in-depth information on this subject.

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