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Sorry, I Can't Open My Camera! Social Anxiety Levels of Prospective Teachers In E-Learning Environments During Covid-19 Pandemic

Görkem Avcı[1], Erkan Dinç[2], Servet Üztemur[3]
[1]Bartın University, 0000-0002-4489-1613
[2]Anadolu University, 0000-0002-0953-3351
[3]Anadolu University, 0000-0002-1580-9123

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Sorry, I Can't Open My Camera! Social Anxiety Levels of Prospective Teachers In E-Learning Environments During COVID-19 Pandemic

Görkem Avcı[1*], Erkan Dinç[2], Servet Üztemur[3]
[1]Bartın University
[2]Anadolu University
[3]Anadolu University

Abstract

The present study aims to determine the social anxiety levels of prospective teachers in e-learning environments. The research adopts the cross-sectional survey model. The study group consists of 506 pre-service teachers through a convenience sampling technique from a state university in northern Turkey during the fall semester of the 2021-2022 academic year. The data are collected online through the "Social Anxiety Scale for E-Learning Environments" in the spring semester of the 2021-2022 academic year. The study found that teacher candidates have a moderate level of social anxiety in e-learning environments which unfavorably affects academic achievement. Moreover, it is concluded that gender is not directly affecting social anxiety in e-learning environments, but the grade level is influential on social anxiety. There is a positive correlation between prospective teachers' self-efficacy in using computers and their social anxiety levels in e-learning environments. This study has revealed new empirical results on the reflections of social anxiety in e-learning environments. The results are discussed in line with the relevant literature and some recommendations are made.

Keywords: Teacher education, Student teacher, E-learning, Distance learning.

Introduction

COVID-19 has been considered the worst pandemic and "public enemy number one" in the millennium. It has changed how we live in the blink of an eye, threatening our existence and health and damaging our economic, social, and educational systems (Khoshaim, 2020). COVID-19 has influenced all the countries in the world in terms of health, economy, sociology, politics, culture, and many others. Undoubtedly, the field of education is among those (Nambiar, 2020; Callaway, et al., 2020; Alea, Fabrea, Roldan & Farooqi, 2020; Korkmaz & Toraman, 2020; Bakioğlu & Çevik, 2020; Özdemir & Önal, 2021; Kedraka & Kaltsidisi, 2020). As a global health problem, COVID-19 has dramatically changed life sciences and education in particular (Arribathi, 2021; Mailizar, Almanthari, Maulina & Bruce, 2020; Stambough et al., 2020; Tümen-Akyıldız, 2020; Carrillo & Flores, 2020; Yükselir & Yuvayapan, 2021). To fight against the pandemic, countries have developed several strategies, and one global strategy is to control the spread of the virus. One of the wisest measures is to close schools and prevent students and instructors from becoming infected (Germann et al., 2019). With the closure of schools, education has become greatly affected by the COVID-19 epidemic. More than a billion students worldwide have been overcome by the closure of schools and universities due to the pandemic (United Nations Educational Scientific and Cultural Organization [UNESCO], 2020). As an effortless and applicable solution, distance education has been introduced to minimize suffering and ensure the sustainability of education (Tümen-Akyıldız & Donmuş-Kaya,2021). In other words, rapidly developing educational technologies in the digital world have emerged as the most appropriate teaching instruments during the pandemic. As a result of this, distance education, which has become an inevitable way out, has begun to be accepted as an effective means of education by large masses. Additionally, all the countries have developed new ways to maintain their educational procedures within the framework of the emergent education system in the world (Gilani, 2020).

Distance education has emerged based on the needs of society. Undoubtedly, the concept of distance education was born of a need that is true for all innovations and inventions in the world (Süğümlü, 2021). Distance education, which has appeared as an alternative to traditional face-to-face education, is deemed as a promising innovation and development with flexibility in learning environments (Allen et al., 2010). Distance education has indeed created an alternative form of education by removing the boundaries of time and space (Bilgiç & Tüzün, 2020). However, many dissimilarities have been experienced due to suspending face-to-face education activities in

* Corresponding Author: *Görkem Avcı, gorkem.avci.35@gmail.com*

universities and implementing online education systems instead (Bao, 2020). As a result of the closure of educational institutions, teachers and students had to adapt to distance learning quickly (Carrillo & Flores, 2020). Teachers and students have experienced various challenges during the distance education (Atreya & Acharya, 2020). Arrangements, which were caught off guard due to their urgent presentation, created psychological, social, and academic problems for university students and they underwent hard tests (Brooks, 2020).

Social anxiety has always been a concern of traditional face-to-face education but has rarely been studied in e-learning settings. Education for the 21st century should consider societal interests and needs (Arribathi et al., 2021). In line with this requirement, a better understanding of social anxiety as a feature that affects interaction and communication in e-learning environments in online education can contribute to the design of more effective learning environments, the development of effective e-learning pedagogies, and the organization of learning environments for practitioners (Bahçekapılı, 2021; Khoshaim, 2020). Therefore, the present study aims to determine the social anxiety levels of prospective teachers in online lessons and to make recommendations in light of the obtained results. The next section of the paper presents the definition of the variables, the theoretical foundations explaining the relationships between them, and the hypotheses.

Online Education and E-learning Environments

Online education has emerged as a strong alternative for maintaining educational procedures, especially during the COVID-19 (Radha et al., 2020; Tamborra, 2021). Most institutions still offer online programs to facilitate learning in our digital age. Online education technology serves to disseminate knowledge (Vaona et al., 2018). The development of information technologies in higher education becomes more evident, particularly with e-learning implementation. E-learning facilitates students' access to information and provides students with a flexible learning opportunity by eliminating physical limitations in face-to-face learning (Kumar, Wotto & Bélanger, 2018). Triggered by growing concerns about the COVID-19 pandemic, all on-campus facilities such as educational activities, workshops, conferences, and sporting events have been postponed/canceled by an increasing number of universities around the world starting in March 2020 and universities quickly transferred various courses and programs to the online environment (Sahu, 2020; Trevisan, De Rossi & Grion, 2020). Face-to-face education and learning processes had to fit the e-learning setting (Wu & McGoogan, 2020). Therefore, e-teaching and learning activities started being carried out online. As a result, the COVID-19 epidemic has had a significant impact, especially on the learning process, and online education has become the only way to carry out educational activities (Gottardo & De Martino, 2020; Falcinelli & Moscetti, 2021; Setianingsih et al., 2019).
The distance education system has both advantages and disadvantages (Pürsün et al., 2021; Süğümlü, 2021). Keskin et al. (2020) assert that various obstacles may hinder learners' social interactions. However, e-learning technologies and social learning environments have become online environments that students can access from anywhere and anytime without the need to be physically there. These new technologies have increased the opportunities of interaction to a great extent. Such factors as social anxiety, academic and technical skills, unreadiness for e-learning, self-regulation, motivation, communication skills, low technology literacy, restrictions, self-efficacy, technophobia, and time can be listed among those barriers (Song et al., 2004; Hill et al., 2009). E-learning has been adopted internationally as an alternative learning and teaching strategy to fill the academic gap created by the current reality of worldwide closures during COVID-19 quarantine (Fawaz & Samaha, 2021).
E-learning is a critical and powerful solution to meet education demand for today's higher education institutions. Most of today's educational institutions offer blended and online courses, and many students attend these courses regardless of time and place limitations. Students' experiences in online learning environments can provide important information to researchers about the quality of education and how much students benefit from online environments. In this direction, these experiences can be explained with the concept of "interaction", which is one of the most important concepts that reveal the quality of e-learning (Miranda & Vegliante, 2019). The most important problem in the distance education process is the decrease in student willingness and motivation due to the lack of face-to-face interaction (Galusha, 1998; Özdoğan & Berkant, 2020). Studies indicate that one of the most important problems in distance education is the lack of interaction (Hebebci, Bertiz & Alan, 2020; Tümen-Akyıldız, 2020; Chen et al., 2001; Jin, 2005; Falowo, 2007). Communication and interaction can directly affect several pedagogical factors such as students' motivation, engagement, satisfaction, and academic achievement (Bahçekapılı, 2021; Can & Bozgün, 2021; Tzafilkou, Perifanou & Economides, 2021). Undoubtedly, the COVID-19 process has become the primary reason for the transformation of face-to-face learning to e-learning. This transition has revealed diverse problems between students and teachers, including technical and psychological difficulties (Arribathi, 2021; Pürsün et al., 2021). Apart from the risk of death, the pandemic has yielded unbearable psychological problems and pressures on people worldwide (Xiao, 2020; Biswas & Biswas, 2021). With the closure of all educational institutions, university students were also quarantined and participated in the new academic semesters remotely via e-learning, thus experiencing different levels of psychological pressure

(Wang & Zhao, 2020). These include anxiety and social anxiety. Thus, anxiety has recently become a critical factor both in education and distance education (Ajmal & Ahmad, 2019).

Social anxiety

Recently, interest in social anxiety has been growing due to the high frequency of cases diagnosed with severe anxiety and depression (Izgic, Akyüz, Doğan & Kuğu, 2004). Anxiety is defined as "the anticipation of a future threat" (American Psychiatric Association [APA], 2013, p.189). On the other hand, social anxiety is described as the fear of being negatively judged, humiliated, or making a negative impression by others, and doing something wrong (APA, 2000; Persons & Tompkins, 2011). Social anxiety or social interaction anxiety is the fear of unfamiliar people, environments, and situations or social situations in which the individual is exposed to scrutiny (Çuhadar, 2012). Individuals may fear that they are being watched or observed by others, fear that they will be evaluated negatively, and may experience social anxiety. The evaluation of oneself by others can lead to social anxiety, avoidance behaviour, fears, and personal disorders. Thus, anxiety or fear can create problems in speaking, performance or motivation in social situations (APA, 2013). Social anxiety plays an active role in educational processes. It can be claimed that failure to succeed caused by anxiety or ideas about the obstacles to success may harm learning processes (Can & Bozgün, 2021). Similarly, Russell & Topham (2012) suggest that social anxiety can impair the academic achievement of universities/university students.

There is a strong relationship between the type of communication (online or face-to-face) and social anxiety (Behrens & Kret, 2019). Accordingly, it is emphasized that students experience higher anxiety levels in distance education than in traditional learning environments (Ajmal & Ahmad, 2019). D'Errico et al. (2016) found that anxiety is a significant element that negatively impacts student performance and motivation in online education. Consistently, anxiety causes students to perform poorly (Ajmal & Ahmad, 2019).

Social anxiety is a decisive factor affecting online interaction (Hutchins et al., 2021). In this context, the most important factors are the types of interaction that indicate what and with whom learners interact. The types of interaction during distance education and e-learning fall into three subcategories: (1) interaction with the instructor, (2) interaction with content, and (3) interaction with learners (Moore, 1989; as cited Keskin et al., 2020). Anxiety is very common in teaching-learning processes, but both students and teachers should eliminate anxiety to achieve predetermined learning goals (Arribathi, 2021). Social anxiety is one factor affecting students' success in online education (Ajmal & Ahmad, 2019). Social anxiety is associated with a great many psycho-educational structures (Keskin et al., 2020). The conceptual framework regarding the learning anxiety of the students in online education is given in Figure 1 to depict the overall picture:

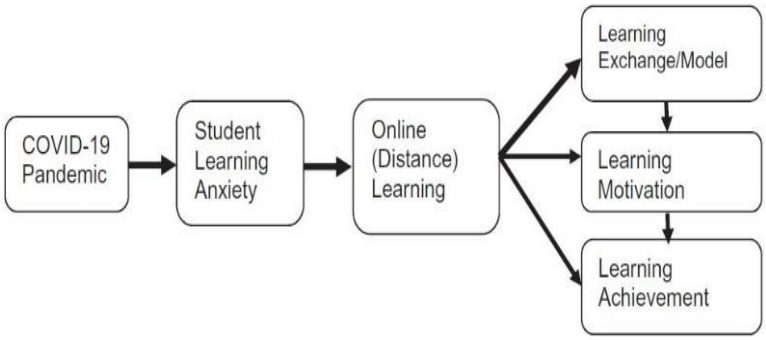

Figure 1. The conceptual framework of student learning anxiety in online education

Figure 1 draws attention to the impact of COVID-19 on learning anxiety in higher education (Arribathi, 2021). In the wake of distance education due to the COVID-19, a number of research has focused on the analysis of the psychological consequences on students' mental health and academic achievement, and an increase in mental health problems such as moderate or severe stress, depression, and decreased emotional self-efficacy among university students have been proven (Tzafilkou et al., 2021). Students' anxiety stemming from various reasons during distance education is directly related to the change in the learning process, learning motivation, and learning success. Undoubtedly, the main factors of e-learning are learning style, enthusiasm, and success, and they are directly related to learning anxiety. On the other hand, anxiety in distance learners in online education is mainly caused by their life experiences and their relevant expectations/assumptions (Ajmal & Ahmad, 2019). Some of the other important factors are technological infrastructure, instructor characteristics, e-learning systems, support, e-learning resources, and training provided to online education (Alhabeeb & Rowley, 2018).

Social Anxiety in E-Learning Environments

COVID-19 has created widespread fear and anxiety worldwide, causing social and physical problems as well as psychological disorders (Ahmad & Husain, 2020). Díaz-Jiménez et al. (2020) concluded that there is a high number of anxiety symptoms for students who have difficulty adapting to distance education. Such factors as future anxiety and changing the place of residence boost the frequency of anxiety symptoms. Similarly, Kocaman and Ersoy (2021) confirmed in their study that students are worried about the uncertainty in the resumption of face-to-face education, the way the exams are conducted, the technical problems experienced during e-learning, and the lack of understanding of the course topics due to the ongoing pandemic. As can be seen, several situations determine social anxiety in e-learning environments. In their study, Fawaz and Samaha (2021) found that e-learning via online platforms causes depression, stress, and anxiety disorders in students. On the other hand, Ajmal and Ahmad (2019) pointed out that factors such as the gap in the adaptation process to distance education, lack of materials, lessons, and support cause anxiety among students. Undoubtedly, it is normal for students to encounter problems during e-learning as they experience psychological problems during distance education. Such variables as the father's level of education, family size, place of residence, academic year, type of housing, and access to high-speed internet also affect students' level of anxiety as the determinants of anxiety (Hoque et. al., 2021). Additionally, students' digital skills are also important for social anxiety in e-learning environments. It has been revealed that the more students have digital skills, the less they experience social anxiety. Students who do not actively participate in the lessons and do not interact and communicate with the teacher through online channels or live chat are more anxious (Bahçekapılı, 2021).

A great many factors may cause and trigger social anxiety in e-learning environments. Gender is among the leading ones (Alsudais et al., 2022; Khoshaim et al., 2020). It may be the gender of the other party that precipitates and exacerbates social anxiety (Erkan, Güçray & Çam, 2002). It was revealed that social anxiety is more common in women than in men university students (Dell'Osso, 2015; Bahçekapılı, 2021). The gender factor also has a decisive effect on the overall level of anxiety (Hoque et al., 2021). In addition to gender, the individuals' age may affect their social anxiety levels in e-learning environments (Alsudais et al., 2022). The age factor, which is highly correlated with the overall anxiety level (Khoshaim et al., 2020), may significantly affect the level of social anxiety. The level of academic achievement is also important besides age and gender in determining social anxiety in e-learning environments (Alsudais et al., 2022). It was noted that anxiety significantly impacts the academic performance of distance learners (Díaz-Jiménez et. al., 2020; Ajmal & Ahmad, 2019). Brook and Willoughby (2015) found that social anxiety has a significant and negative direct relationship with academic achievement. Similarly, it was revealed that students with low performance during e-learning have higher social anxiety levels than students with high performance (Alsudais et. al., 2022). The high performance of students in e-learning is acceptable. Learning anxiety that directly affects e-learning is offline interaction, learning motivation, and change in learning mode (Arribathi, 2021).

Current Research

The present study's main aim is to determine prospective teachers' social anxiety levels in online courses. For this purpose, answers to the following questions were sought:

1. What is the social anxiety level of the participants in their interactions with both other learners and the instructor in e-learning environments?
2. Do the social concerns of the participants in their interactions with both other learners and the instructor in e-learning environments negatively predict their academic achievement?
3. Do the participants' mean scores for the sub-dimensions of avoidance of interaction, somatic symptoms, and negative evaluation differ significantly by gender and grade levels?
4. What is the relationship between the self-efficacy perceptions of the participants in using computers and their social anxiety in their interactions with other learners and the instructor in e-learning environments?

Method

This study was designed with a cross-sectional survey model. In cross-sectional studies, where the sample is huge and consists of a great many different qualities, the variables to be investigated are measured at once (Fraenkel et al., 2012).

Research Context and Sample

The study group consists of 506 prospective teachers determined through a simple random sampling technique from a university in northern Turkey during the fall semester of the 2021-2022 academic year. The data were collected in January 2021 using an online questionnaire. To determine the academic performance of the students, participants were asked to record their current grade point average. The personal data of the study group are shown in Table 1.

Table 1. Demographics of the study group

Variable	Category	Frequency f	Percentage %
Grade Level	Freshman	113	22,3
	Sophomore	127	25,1
	Junior	152	30
	Senior	114	22,5
	Total	506	100
Gender	Female	283	55,9
	Male	223	44,1
	Total	506	100
Branch	Math	87	17,2
	Psychological Counseling and Guidance	77	15,2
	Social Studies	77	15,2
	Turkish Language	84	16,6
	Science and Technology	90	17,8
	English Language	91	18
	Total	506	100

Instruments Used and Their Validation

"The Social Anxiety Scale for E-Learning Environments (SASE)" developed by Keskin and colleagues (2020), was used to measure the social anxiety level of the study group in e-learning environments. The 7-point Likert-type scale includes two themes dealing with learner-learner interaction and learner-instructor interaction. Each theme consists of the sub-dimensions of negative evaluation (9 items), somatic symptoms (4 items), and avoidance of interaction (10 items). High sub-dimension scores imply a high level of social anxiety in e-learning environments. Sample items and Cronbach's alpha internal consistency coefficients for the sub-dimensions of the scale are given in Table 2.

Table 2. SASE Sub-dimensions and alpha internal consistency coefficients

Dimension	Alpha	Sample Items
Negative Evaluation	.94*	*In e-learning environments, I worry about being seen as an idiot because of my questions on talk pages.
	.96**	**When communicating with the instructor in e-learning environments, I think what I write will be negatively evaluated.
Somatic Symptoms	.88*	*My heart starts beating fast as I communicate on talk pages in e-learning environments.
	.92**	**When communicating with the instructor in e-learning environments, I get restless when communicating.
Avoidance of Interaction	.95*	*In e-learning environments, I prefer to remain silent to avoid making a bad impression on the talk pages.
	.96**	**In e-learning environments, I find it difficult to ask for help when I need to communicate with the instructor.

Note. Learner-Learner, **= Learner-Instructor

Table 2 indicates that the alpha internal consistency coefficients of the sub-dimensions for both scale themes are excellent. The confirmatory factor analysis (CFA) results for the 23-item sub-theme addressing the learner-learner interaction revealed that the original three-dimensional structure was confirmed and the fit indices were acceptable, $\chi2 = 842{,}372$, df =219, $p< .000$, $\chi2/df= 3{,}846$, IFI = .95, SRMR = .03, RMSEA = .07, CFI=.95, TLI= .94. The confirmatory factor analysis (CFA) results for the 23-item sub-theme addressing the learner-instructor interaction yielded that the original three-dimensional structure was confirmed, and the fit indices were acceptable, $\chi2 = 826{,}296$, df =221, $p< .000$, $\chi2/df= 3{,}739$, IFI = .96, SRMR = .02, RMSEA = .07, CFI=.96, TLI= .95. The pre-service teachers' self-efficacy in using computers was estimated through a single item ranging from 1 to 5.

Data Analysis

Analyses were conducted respectively to the research questions. Firstly, descriptive statistics and normality tests were estimated for the relevant variables. Secondly, multiple regression analyses were performed to predict academic achievement. Thirdly, one-way analysis of variance and t-test tests were conducted for variables such as gender and grade levels. Lastly, the Pearson product-moment correlation coefficient was calculated, and

multiple regression analyses were performed to reveal the relationship between the variables. SPSS software package was used in statistical analyses. The significance value of .05 was adopted for all statistics.

Findings

This section presents the research findings in the order of sub-goals of the study.

Findings Regarding the First Sub-goal

The social anxiety levels in their interactions with other learners and the instructor in e-learning environments are submitted in Table 3.

Table 3. Social anxiety levels of participants

	Learner-Learner			Learner-Instructor		
	Negative Evaluation	Somatic Symptoms	Avoidance of Interaction	Negative Evaluation	Somatic Symptoms	Avoidance of Interaction
Mean	3,62	3,42	3,49	3,59	3,40	3,30
Std. Dev.	1,59	1,68	1,61	1,71	1,82	1,65
Skewness	,15	,29	,28	,18	,293	,40
Kurtosis	-,941	-,954	-,854	-1,063	-1,150	-,907
Minimum	1	1	1	1	1	1
Maximum	7	7	7	7	7	7

As can be inferred from the skewness and kurtosis values in Table 3, the variables are normally distributed (kurtosis and skewness $\leq |2|$). It can be claimed that the participants' social anxiety levels are moderate.

Findings Regarding the Second Sub-goal

The results of the multiple regression analysis performed to determine the effect of the sub-dimensions of SASE on academic achievement (dependent variable) are shown in Table 4.

Table 4. Multiple Regression Model for Predicting Academic Achievement

Variable	B	Std. Er.	β	t	p	Partial r	Part r	Tolerance	VIF
Constant	3,429	,044		78,018	,000				
Negative Evaluation*	-,106	,041	-,420	-2,611	,009	-,270	-,118	,072	9,896
Somatic Symptoms*	,051	,031	,215	1,627	,104	-,214	,074	,106	9,411
Avoidance of Interaction*	,028	,042	,113	,666	,506	-,270	,030	,065	8,490
Negative Evaluation**	,065	,041	,275	1,599	,110	-,249	,072	,063	7,977
Somatic Symptoms**	-,004	,030	-,019	-,143	,886	-,231	-,007	,101	9,855
Avoidance of Interaction**	-,108	,036	-,444	-3,007	,003	-,292	-,135	,085	9,785
R= .320	R2 = .103								
F (6-485) = 9,245 p = . 000									

Note. *= Learner-Learner, **= Learner-Instructor

To meet the assumptions of multiple regression analysis, we checked that the variables were normally distributed, and the Mahalanobis distance was estimated for outliers in SPSS. Based on the chi-square critical value table given by Tabachnick & Fidell (2013, p. 952), 14 data above the 22.45 value, corresponding to 6 degrees of freedom for the .001 significance level, were excluded from the analysis as being outliers. Additionally, tolerance and VIF values were examined to reveal whether there was multicollinearity between the independent variables. Table 4 indicates that the tolerance values of each independent variable included in the multiple regression are greater than .20, and the VIF values are less than 10. These findings suggest that each independent variable observed in the multiple regression model measures a different attribute; that is, there is no problem with multiple correlations between the independent variables.

Multiple linear regression analysis performed to determine how the independent variables predicted the academic achievement of the participants revealed a significant relationship between the variables. (R = .320, R2 = .103) with the academic achievement [F (6-485) = 9,245, p< .01]. All of the independent variables together explain 10.3% of the variance in academic achievement scores. The significance tests of the standardized regression coefficients indicated that only negative evaluation (learner-learner) (β = -.42) and avoidance of interaction (learner-instructor) (β = -.42) variables were the significant predictors of academic achievement (p<.01).

Academic achievement has a significant negative relationship with negative evaluation (learner-learner) by r= -.270 (-.118 when the effect of other independent variables is under control), and avoidance of interaction (learner-instructor) by r= -.292 (-.135 when the effect of other independent variables is under control). As a result of the multiple regression analysis, the regression equation that predicts the academic achievement of the participants is as follows:
Academic Achievement = (-0.106 x negative evaluation [learner-learner]) + (-0.108 x avoidance of interaction [learner-instructor]).

Findings Regarding the Third Sub-goal

Table 5 shows the t-test results conducted to reveal whether the participants' mean scores for the sub-dimensions of avoidance of interaction, negative evaluation, and somatic symptoms differ significantly by gender.

Table 5. T-test results by gender

Dimensions		Gender	N	Mean	Std. Dev.	t	df	p
Learner-Learner	Negative Evaluation	Female	274	3,76	1,56	2,365	490	.018
		Male	218	3,42	1,60			
	Somatic Symptoms	Female	274	3,62	1,69	2,914	490	.004
		Male	218	3,18	1,66			
	Avoidance of Interaction	Female	274	3,61	1,63	1,916	490	.056
		Male	218	3,33	1,60			
Learner-Instructor	Negative Evaluation	Female	274	3,75	1,69	2,313	490	.021
		Male	218	3,39	1,70			
	Somatic Symptoms	Female	274	3,57	1,82	2,403	490	.017
		Male	218	3,18	1,80			
	Avoidance of Interaction	Female	274	3,42	1,67	1,445	490	.149
		Male	218	3,20	1,63			

As can be seen in Table 5, the mean scores of the participants in the negative evaluation and somatic symptoms sub-dimensions differed significantly by gender. Accordingly, it can be claimed that women have higher social anxiety levels compared to men in their interactions with both other learners and the instructor. The scores obtained from the avoidance of interaction sub-dimension did not result in a significant difference by gender. The scores of women and men in the avoidance of interaction sub-dimension were close to each other. Hence, gender did not create a significant difference in the avoidance of interaction sub-dimension in the interaction of the participants with both other learners and the instructor.

The results of the one-way ANOVA test, which was conducted to reveal whether the participants' mean scores for the sub-dimensions of negative evaluation, somatic symptoms, and avoidance of interaction differ significantly by grade level, are presented in Table 6.

Table 6. One way ANOVA results by grade level.

Negative Evaluation*	Grade level	N	M	S	Source of Variance	Sum of Squares	df	Mean Square	F	p
	1	112	3,86	1,61	Between Groups	31,657	3	10,552	4,241	,006
	2	122	3,85	1,54	Within Groups	1214,359	488	2,488		
	3	148	3,27	1,55	Total	1246,016	491			
	4	110	3,56	1,60						
Somatic Symptoms*	Grade level	N	M	S	Source of Variance	Sum of Squares	df	Mean Square	F	p
	1	112	3,63	1,70	Between Groups	28,476	3	9,492	3,348	,019
	2	122	3,67	1,68	Within Groups	1383,521	488	2,835		
	3	148	3,09	1,62	Total	1411,997	491			
	4	110	3,40	1,73						
Avoi danc	Grade level	N	M	S	Source of Variance	Sum of Squares	df	Mean Square	F	p

	1	112	3,75	1,66	Between Groups	36,025	3	12,008	4,655	,003
	2	122	3,74	1,58	Within Groups	1258,904	488	2,580		
	3	148	3,12	1,55	Total	1294,929	491			
	4	110	3,43	1,64						
Negative Evaluation**	Grade level	N	M	S	Source of Variance	Sum of Squares	df	Mean Square	F	p
	1	112	3,84	1,72	Between Groups	33,422	3	11,141	3,903	,009
	2	122	3,82	1,63	Within Groups	1393,084	488	2,855		
	3	148	3,22	1,65	Total	1426,506	491			
	4	110	3,56	1,75						
Somatic Symptoms**	Grade level	N	M	S	Source of Variance	Sum of Squares	df	Mean Square	F	p
	1	112	3,68	1,87	Between Groups	43,227	3	14,409	4,436	,004
	2	122	3,68	1,78	Within Groups	1585,090	488	3,248		
	3	148	2,99	1,70	Total	1628,317	491			
	4	110	3,35	1,87						
Avoidance of Interaction**	Grade level	N	M	S	Source of Variance	Sum of Squares	df	Mean Square	F	p
	1	112	3,55	1,70	Between Groups	28,240	3	9,413	3,472	,016
	2	122	3,54	1,60	Within Groups	1322,990	488	2,711		
	3	148	2,99	1,59	Total	1351,230	491			
	4	110	3,31	1,69						

Note. *= Learner-Learner, **= Learner-Instructor, 1= freshman , 2= sophomore , 3= junior , 4= senior

The analysis results demonstrated that the mean scores obtained from the three sub-dimensions for the theme of learner-learner interaction differed significantly in terms of the grade levels of the participants. Scheffe test results revealed that juniors had less social anxiety for the sub-dimensions of negative evaluation and avoidance of interaction in e-learning environments compared to freshmen and sophomores. Sophomores are more socially anxious about the somatic symptoms sub-dimension in e-learning environments compared to juniors. The social anxiety scores of the participants in the avoidance of interaction sub-dimension for the learner-instructor theme did not differ significantly by grade level. The results of the Scheffe test for the other two subdimensions showed that juniors had less social anxiety in e-learning environments compared to freshmen and sophomores.

Findings Regarding the Fourth Sub-goal

The results of the Pearson product-moment correlation analysis conducted to reveal the relationship between self-efficacy perceptions of using computers and the sub-dimensions of learner-learner and learner-instructor themes are submitted in Table 7.

Table 7. Correlation coefficients

	Variable	1	2	3	4	5	6	7
	1 self-efficacy to use pc	1	-,242**	-,219**	-,197**	-,202**	-,212**	-,176**
Learner-Learner	2 negative evaluation		1	,712**	,717**	,656**	,588**	,683**
	3 somatic symptoms			1	,677**	,597**	,732**	,652**
	4 avoidance of interaction				1	,723**	,683**	,653**
	5 negative evaluation					1	,706**	,705**
Learner-Instructor	6 somatic symptoms						1	,673**
	7 avoidance of interaction							1

Note. **p<.01

It can be claimed that the participants' social anxiety levels are moderate. As can be seen in Table 7, there are negative and low-level significant relationships between self-efficacy in using a computer and the sub-dimensions of the social anxiety scale. Accordingly, it can be alleged that if the self-efficacy levels of the participants in using

a PC increase, their social anxiety levels in e-learning environments will decrease. Highly significant positive correlations do exist between the sub-dimensions of both learner-learner and learner-instructor themes of the social anxiety scale.

Discussion and Conclusion

This study aimed to establish the degrees of social anxiety that prospective teachers experience when working in online learning environments and to shed light on the situation as it currently stands in terms of specific aspects.As a result, the study determined that the participants had a moderate level of social anxiety in their interactions with other learners and the instructor in e-learning environments. This result is basically what is predicted to happen. This may have been due to the unprepared involvement of the participants in the process, their lack of previous experience in e-learning environments, and most importantly, the setting excluding the potential for socialization contrary to human nature. In their study with university students in the e-learning process, Hoque et al. (2021) found that the majority of the students (82,5%) experienced a moderate level of anxiety which was predicted by gender, father's level of education, family size, residence, academic achievement, type of housing and access to high-speed internet. Similarly, Islam et al. (2020) noted that the majority of students (87,7%) had a moderate level of anxiety in another study conducted with university students. It was presumed that the uncertainties about educational processes may have been negatively affected by the high number of cases worldwide and students' anxiety levels about their health with their families (Durgun et. al., 2021). Unlikely, Cao et al. (2020), in their study with university students, did not report any signs of anxiety for the vast majority of students (75,1%) during the COVID-19 pandemic. Díaz-Jiménez et al. (2020) also did not find any signs of anxiety in most students during the pandemic. Undoubtedly, diverse and complex factors cause social anxiety (Prendergast, 2021). These may be due to individual differences, country-place-region differences, culture, environmental factors, income, socio-economic status, technological equipment, internet infrastructure, and familial background (Ajmal & Ahmad, 2019; Díaz-Jiménez et. al., 2020; Fawaz & Samaha, 2021; Hoque et al., 2021; Kocaman & Ersoy, 2021).

Another prominent result of the study is that participants' social anxiety levels in their interactions with other learners and the instructor in e-learning environments significantly predicts their academic achievement. Accordingly, it can be alleged that there is a negative relationship between social anxiety levels in e-learning environments and academic achievement, and social anxiety harms learning outcomes. Many studies have emphasized that social anxiety may impair the academic achievement of university students (Brook & Willoughby, 2015; Russell & Topham, 2012). Recent studies have shown that the experience of e-learning anxiety significantly affects academic achievement (Saadé et al., 2017; Ajmal & Ahmad, 2019). Hence, it is possible to come across a great deal of evidence in the literature that anxiety affects achievement negatively, and positive attitudes affect academic achievement affirmatively (Arslan & Korkmaz, 2019). It is predictable for students with high academic achievement to have low levels of social anxiety. It has been revealed that students with low performance during e-learning have higher social anxiety levels than those with high performance (Alsudais et al., 2022). Sübaşı (2007) also found that social anxiety badly affects students' academic achievement in her study with university students. The study conducted by Al-Hazmi, Sabur and Al-Hazmi (2020) revealed that there is a significant negative relationship between the social anxiety levels of medical students and their academic performance. It is necessary to reduce students' anxiety towards interaction and increase their positive attitudes toward distance education to improve their achievement in distance education (Arslan & Korkmaz, 2019). It can be alleged that the self-efficacy and attitude levels of prospective teachers towards distance education, their perceptions regarding the learning environment, and their opinions are crucial to being successful in distance education (Hacıömeroğlu & Elmalı-Erdem, 2021). Although there are varying findings, most studies evidence that anxiety is a negative predictor of academic performance (Tzafilkou, Perifanou & Economides, 2021). Nevertheless, some other university students found that social anxiety does not predict academic achievement (Heckel & Ringeisen, 2019; Çağlar, Dinçyürek & Arsan, 2012; Temizel, 2014). It may stem from individual factors, divergent psychological conditions, expectations, and needs.

Considering the relationship between the genders of the participants and their social anxiety, it can be asserted that women have higher levels of social anxiety compared to men in their interactions with both other learners and the instructor for the sub-dimensions of negative evaluation and somatic symptoms. The mean scores obtained from the avoidance of interaction sub-dimension did not differ by gender. Gender is a significant variable in e-learning environments, and students' anxiety may vary according to their gender (Fawaz & Samaha, 2021; Durusoy, 2019; Roberts, Hart, Coroiu & Heimberg, 2011; Wongwatkit et al., 2020). As a result of a study on university students, Bahçekapılı (2021) found that female students experienced significantly more social anxiety than male students in e-learning environments. Some studies on university students have determined that the gender factor is in a significant relationship with the level of social anxiety, and the anxiety level of women is higher than that of men (Durusoy, 2019; Küçük, 2019; Wang, Zhao & Zhang, 2020). Women may experience

more anxiety than men due to some genetic, biological, and social factors (McLean & Anderson, 2009). On the other hand, the researchers stated that it might be caused by the different expectations of society from men and women and the conventional wisdom that women are shyer than men (Şıngır, Ayvaz & Tonga; 2021). Therefore, the cultural expectation of collectivist societies that women should be humble, quiet, and dignified could potentially justify these results (Alsudais et al., 2022; Karakitapoglu-Aygun & Olcay-Imamoglu, 2002). On the other hand, it is not certain to what extent gender affects anxiety in e-learning environments (Bahçekapılı, 2021). Studies concluded that gender does not cause a significant difference in social anxiety (Aune & Stiles 2009; Ayberk, 2011; Al-Hazmi, Sabur & Al-Hazmi, 2020; Bayraktutan, 2014; Cao et al., 2020, Hakami et al., 2018). On the other hand, some studies in the literature indicate that men's social anxiety levels are higher than women's, unlike our results (Ateş, 2015; Elhadad et al., 2017; Noyan & Berk, 2007). Considering all these, it can be asserted that social anxiety in e-learning environments does not reveal consistent results in terms of gender. The primary reason for this is the behaviour patterns that societies impose on gender.

As for grade levels, it was observed that students with low-grade levels experienced relatively more social anxiety in their interactions with both other learners and the instructor. This study result is associated with the fact that freshmen's insufficient knowledge in theoretical and applied courses, lack of distance education experiences, and loose friendship relations. Similarly, Ağırtaş and Güler (2020) determined that there is a significant difference between the social anxiety levels of undergraduate students in terms of grade level. As a result of the study, it was yielded that the social anxiety levels of the students differed significantly depending on the grade levels, and the social anxiety level of the freshmen was higher than that of juniors and seniors. These results may stem from the recent departure of freshmen from high school they have been accustomed to and their recent move to the university (Paul & Brier, 2001). Similarly, Khoshaim et al. (2020) concluded that students in the last years of university education have lower anxiety levels than students in lower grades. They pointed out that upper-class students are less affected by e-learning. In other words, the closer the students are to their future lives and the shorter their student life is, the less they are affected by e-learning and the lower their anxiety level is. Unlike our results, Aktan (2018) determined that there was no significant difference between the grade level of the participants and their social anxiety as a result of a study conducted with university students. Similarly, Wang, Zhao, and Zhang (2020) found that there is no significant relationship between grade level and anxiety in the e-learning process. On the other hand, Al-Hazmi, Sabur and Al-Hazmi (2020) yielded that the students with higher grade levels have less social anxiety compared to students at the beginning of their academic life. Thus, it can be claimed that the students become more familiar with e-learning environments, so their social anxiety levels get lower with higher grade levels.

A negative correlation was found between the participants' self-efficacy in using computers and their social anxiety. The fact that participants can use computers independently may reduce their self-confidence-based social anxiety. In our age, the use of digital tools and equipment is not only a necessity, but it can also eliminate anxiety by giving individuals self-confidence. The level of self-efficacy towards computer use and the perception that using a computer is easy significantly affect online learning applications and the level of anxiety in these learning environments (Saadé & Kira, 2009). Bahçekapılı (2021), in his study, revealed that there is a low level of negative correlation between students' digital literacy levels and social anxiety levels in coordinated courses in e-learning environments. In other words, students' digital literacy knowledge and digital skills increase as their social anxiety decreases in online courses. Self-efficacy for online technologies (Hacıömeroğlu & Elmalı-Erdem, 2021) as one of the leading factors in distance education is also important in e-learning environments in terms of certain technical issues such as accessing lessons, controlling camera and microphone, and using chat. On the other hand, self-insufficiency toward digital technologies can be attributed to the lack of technological and technical skills leading to social anxiety (Bahçekapılı, 2021). Therefore, the belief that an individual will make fewer mistakes as s/he gains experience in e-learning environments reduces the possibility of negative evaluation by others, reducing social anxiety in e-learning environments. The use of technology and digital tools in the e-learning process serves as the basis for disseminating knowledge (Vaona et al., 2018). From a social learning perspective, self-efficacy helps to reduce social anxiety in web-based learning environments (Hill et al., 2009). Alsudais et al. (2022) pointed out that factors potentially related to the e-learning environment, such as technical background and computer self-efficacy in the learning environment (Chiu & Wang, 2008), will also affect students' level of social anxiety in e-learning. Students with high e-learning self-efficacy perceive more contextual control when dealing with any online platform, are more interested in mastering learning and technology-related challenges, are more willing and motivated and experience lower anxiety levels (Heckel & Ringeisen, 2019). In addition to the self-efficacy of using a computer, an internet connection is a must in distance education to be included in online environments. As a result of their study, Hoque et al. (2021) revealed that students who do not have a high-speed internet connection feel more anxious in e-learning environments.

As a result of the present study, which was conducted to reveal the current situation regarding certain variables by determining the level of social anxiety of pre-service teachers in e-learning environments, it was found that

pre-service teachers had a moderate level of social anxiety in e-learning environments, and the level of social anxiety negatively affects academic performance. In addition, the gender of pre-service teachers was found to have no direct effect on social anxiety in e-learning environments, but their grade level was critical to social anxiety. Furthermore, a direct relationship was found between prospective teachers' self-efficacy in using computers and their social anxiety in e-learning environments. Studies in the literature have yielded parallel or different results to the present study. Since these studies were conducted in different countries/regions, social, cultural, and economic factors may have had an influence.

Recommendations

Given the results obtained, it is necessary to incorporate practices that ensure moderate levels of social anxiety and positive attitudes toward e-learning in order to increase the level of student achievement in distance education e-learning environments.Students should be encouraged to actively participate in the lesson by turning on audio and video during the lessons. Applications should be developed that will allow students to interact with their friends and instructors during synchronous lessons. Appropriate strategy-method-techniques should be adopted in synchronous lessons for instructor-learner interaction and learner-learner interaction, and e-learning should be supported by a face-to-face learning environment if necessary. Technical support and training should be provided so that students can actively use technological devices such as computers and tablets. Administrative bodies should collaborate with universities to provide students with rapid and accurate psychological support. To ensure that students continue to participate in the educational processes, universities should develop comprehensive online-based education programs in collaboration with internet service providers. These programs should be designed to reach students residing in remote areas, regardless of whether or not the students have access to a device.

Authors Contribution Rate

The authors contributed equally to the paper.

Conflicts of Interest

Authors declare that they have no conflict of interest.

Ethical Approval

Ethical permission (2022-SBB-0163) was obtained from Bartın Universty Social and Human Sciences Ethics for this research.

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