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Maritime Students' Assessment of Distance Education During the COVID-19 Pandemic

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Abstract

The coronavirus diseases-2019 (COVID-19) outbreak emerged in late 2019 and rapidly spread worldwide, resulting in a pandemic. The pandemic has had negative impacts on various aspects of life, particularly health and the economy. Education sector has been severely affected, as well. In Türkiye, as in many countries, face-to-face classes were replaced with distance education as a safety measure against the pandemic. Maritime education places significant emphasis on providing practical, hands-on training to its students. However, due to the COVID-19 pandemic, a shift to distance education was required, including the teaching of applied courses in this field of study. In this regard, revealing the evaluations of maritime students on distance education is an important issue that needs to be studied. Therefore, this study aims to evaluate the opinions of maritime faculty students in Türkiye regarding the technical aspects and learning process of the distance education that they received during the pandemic. To this end, the "Distance Education Evaluation Scale" was administered to students via an online platform, and the resulting data were analyzed using SPSS Statistics 25. The results show that male students have a more positive evaluation of distance education than female students. Those who participate in distance education by using mobile phones have a more negative evaluation of distance education, while successful students have a more positive evaluation of distance education. Finally, there was no significant difference according to universities and classes.

Keywords: Distance education, COVID-19, Maritime education, Maritime students

1. Introduction

When the virus outbreak occurred all over the world, many measures were taken against the coronavirus diseases-2019 (COVID-19) pandemic. One of the sectors in which strict measures were taken was the education sector. At the beginning of February 2020, only schools in China and some other affected countries were closed due to the rapidly increasing number of cases. However, by mid-March 2020, about 75 countries implemented or announced the closure of educational institutions [1]. In the fight against the COVID-19 pandemic, countries replaced traditional face-to-face education with distance education as a defense tool. In the months that followed, the distance education approach was adopted by many countries as the most applicable solution in terms of ensuring the continuity of education [2,3]. This approach has also been used in other disaster situations apart from the pandemic. For example, after the earthquake disaster in Türkiye in 2023, all universities switched from face-to-face education to distance education. Yet, although many countries were exposed to natural and man-made disasters before, distance education was not used as a solution to these crises in the way that it was applied during the COVID-19 crisis [2].

"Distance education" is defined as the carrying out of learning and teaching activities by means of various technological tools in situations wherein students and teachers are not interacting face-to-face [4]. When the first COVID-19 case in Türkiye was recorded in March 2020, distance education was immediately implemented at all educational levels. Although the first instance of distance education in our country started in the 1980s [5], its implementation in 2020 was considered a novelty not only by university students who were not educated in the distance education system, but also by the academics who

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had to use this approach. Apart from requiring a sudden change and adoption of technology among the users, it also became necessary for universities to have an infrastructure that can conduct courses with such a system or to develop their existing infrastructure quickly. Teaching staff, who have been teaching for years in the formal education system using their own methods, tried to adapt, use, and develop the emergency distance education system, which became compulsory due to the COVID-19 pandemic [6].

The transition to distance education during the COVID-19 pandemic affected all students, including those studying at maritime faculties. Applied courses have an important place in the departments of "Maritime Transportation and Management Engineering (Deck)" and "Marine Engineering (Engine)" in maritime faculties. Students studying in these departments had to take all their courses through distance education due to the pandemic. In this regard, how students in maritime faculties experienced the distance education process is an important research subject. Therefore, this study aims to evaluate the views of Turkish students studying at maritime faculties regarding the required distance education mode of learning during the COVID-19 pandemic.

In the following section, a literature review is presented. Section 3 describes the theoretical framework of the study. In Section 4, the sample of the study, data collection tool, and data analysis are presented. Section 5 includes the findings of the study, including descriptive statistics, normality results, reliability test and factor analysis, and hypothesis tests. Section 6 presents the discussion of the findings, while Section 7 concludes the paper and provides a general evaluation.

2. Literature Review

We conducted a literature review of related studies on the experiences, opinions or perceptions of university students (undergraduate or postgraduate students) regarding distance education during the COVID-19 period. The obtained and examined studies are summarized in Table 1. It was observed that numerous studies were carried out in Türkiye, Saudi Arabia, Jordan, India, China, Vietnam, the United Kingdom, Sweden, Indonesia, and Romania. In terms of data collection methods, it was seen that questionnaires were used in the majority of the studies, while the interview method was used in some of them.

Distance education during the COVID-19 pandemic has had various effects on students. In the study of Aksoğan [7], participants indicated that distance education negatively affected their socialization. The results also showed that males had more positive opinions of distance education compared with females. According to Chakraborty et al. [8], most of the participants stated that they learned better in physical classes than in online classes. Additionally, they stated that online education was more stressful and negatively affected their health and social lives. Dinu et al. [9] revealed the direct effects of the transition to distance education and the indirect effects arising from the COVID-19-related lockdowns. Savaş [10] found that the majority of students had difficulties focusing on distance education and this situation was related to gender, frequency of exercising at home, and type of university in which they were enrolled. Kartallıoğlu [11] observed a decline in the Turkish language levels of students learning Turkish as a foreign language, due to technological and educational problems they faced during the distance education process.

As reported in the reviewed studies, there have been some difficulties in distance education during the COVID-19 pandemic. According to Slamet et al. [12], the supervision of students' theses could not be carried out by distance education as it required interactive communication. Baykal and Tutuncu [13] concluded that students were unable to take advantage of applied courses during distance education and that they had problems arising from the system, themselves, and other factors. Nordqvist [14] reported that one of the biggest challenges students faced during the COVID-19 pandemic related to their ability to improve the English language. According to Karaaslan et al. [15], factors such as economic conditions, asynchronous learning, proficiency levels related to the use of technological software and devices, and provision of preliminary information affected the success of distance education. The results in the study of Alasmari [16] revealed that an efficient and supportive infrastructure played an important role in implementing emergency distance education during the COVID-19 pandemic.

Students' satisfaction with the distance education they received during the pandemic were revealed in some studies. For example, Dinh and Nguyen [17] found that, among social work students, their levels of satisfaction with face-to-face teaching were notably greater than their satisfaction with online teaching across all criteria. In the study of Bataineh et al. [18], the majority of the university students they investigated revealed that face-to-face education was a better approach than the distance learning method. Şeker [6] determined that students were more than moderately satisfied with the distance education system in general, while Çırakoğlu and Özbay [19] reported that dental students showed a negative attitude and low level of satisfaction with distance education.

In some studies, the factors affecting student satisfaction with distance education were stated. For example, according to Zaharia et al. [20], the functionality of the online platform

Table 1. *Literature review*

Author/Year	Subject	Data collection method	Sample	Country
Aksoğan (2020) [7]	Opinions of students on distance education in the COVID-19 pandemic	Questionnaire	508 university students	Türkiye
Alasmari (2021) [16]	Experiences of university students and instructors regarding distance education during the COVID-19 pandemic	Questionnaire	916 instructors 4623 university students	Saudi Arabia
Bataineh et al. (2021) [18]	Jordanian university students' evaluations of distance education during the COVID-19 pandemic	Questionnaire	871 undergraduate students 129 postgraduate students	Jordan
Baykal and Tutuncu (2022) [13]	Experiences of students studying in health care departments about distance education during the COVID-19 pandemic	Interview	40 university students (in health care departments)	Türkiye
Chakraborty et al. (2021) [8]	Opinions of undergraduate students about online education during the COVID-19 pandemic	Questionnaire	358 undergraduate students	India
Chen et al. (2020) [21]	User satisfaction with online education platforms during the COVID-19 pandemic	Questionnaire	712 students (primary school, middle school, high school, university, and postgraduate students)	China
Çırakoğlu and Özbay (2022) [19]	Evaluations of dental students on distance education during the COVID-19 pandemic	Questionnaire	1375 undergraduate dental students	Türkiye
Dinh and Nguyen (2020) [17]	Satisfaction of social work students with online education during the COVID-19 pandemic	Questionnaire	186 undergraduate social work students	Vietnam
Dinu et al. (2022) [9]	Perceptions of students about online education during the COVID-19 pandemic	Qualitative surveys and interview	417 students (undergraduate and postgraduate students)	United Kingdom
İnce et al. (2020) [22]	Views of students on distance education in the COVID-19 pandemic process	Questionnaire	1011 university students	Türkiye
Karaaslan et al. (2022) [15]	Experiences of nursing students with distance education during the COVID-19 pandemic	Questionnaire	454 undergraduate nursing students	Türkiye
Kartallıoğlu (2022) [11]	Opinions of the university students about distance education during the COVID-19 pandemic	Interview	31 university students (learning Turkish as a foreign language)	Türkiye
Nordqvist (2022) [14]	Evaluations of Swedish university students about distance education during the COVID-19 pandemic	Questionnaire and interview	61 undergraduate students	Sweden
Savaş (2021) [10]	University students' perceptions of their distance education experiences during the COVID-19 pandemic	Questionnaire	3861 university students (undergraduate and postgraduate students)	Türkiye
Slamet et al. (2021) [12]	Experiences of lecturers and students on distance education in Indonesia	Questionnaire	123 lecturers 404 university students	Indonesia
Şeker (2021) [6]	Opinions of students on distance accounting education during the COVID-19 pandemic	Questionnaire	124 undergraduate students	Türkiye
Zaharia et al. (2022) [20]	Student satisfaction with distance education during the COVID-19 pandemic	Questionnaire	446 undergraduate and postgraduate students	Romania

and attendance in online classes significantly impacted student satisfaction with online education in Romania. Chen et al. [21] determined that the personal factors of online education users did not directly affect user satisfaction and that platform usability had the highest effect on satisfaction. İnce et al. [22] found that students' opportunities to have a personal computer and Internet connection affected their opinions about distance education.

Overall, considering the relevant literature, it has been observed that some studies have examined the opinions and experiences of students enrolled in departments where applied courses play an important role. Among them were dental, nursing, and health care students.

It is also important to examine the views of maritime students about distance education. Maritime education places great emphasis on practical, hands-on training, because many of the skills required to work in the industry, such as navigating a ship, operating machinery, and handling cargo, can only be learned through practical experience. During the COVID-19 pandemic, maritime students had to take all their courses online, including the important applied courses. In this regard, there is a need for a study to investigate maritime students' experiences with distance education during the COVID-19 pandemic.

3. Research Hypotheses

With the onset of the pandemic, traditional educational services were replaced by distance education, wherein online platforms became the primary mode of instruction and the only means of delivering educational services [20]. To participate in distance education, it is crucial that both instructors and students possess the ability to use technology effectively [15]. However, given the technical problems that emerged with the use of online education platforms, it is important to investigate whether online education platforms are capable of fulfilling the requirements of both students and instructors [21]. At the same time, the quality of Internet access, which can lead to poor connection and audio quality, can create several challenges for students participating in online courses [17]. In cases wherein students cannot access the Internet, the desired results of distance education cannot be achieved [23]. For these reasons, the technical dimension of distance education was considered while determining the research hypotheses in this study.

The process of distance education is a complex and demanding practice that requires considerable effort to effectively involve students in online classes and accomplish the desired educational outcomes. This unexpected mode of teaching and learning presents several challenging responsibilities for both instructors and students [18]. Effective communication and interaction between instructors and their students play a crucial role in facilitating the learning process (LP). However, the learning experience in distance education is limited due to the difficulty in facilitating communication and interaction compared with a face-to-face classroom environment. This is exacerbated by the considerable physical distance between instructors and students. Besides, building an emotional connection between instructors and students is challenging in distance education because of the lack of interaction in this mode of learning [24]. As a result, it is crucial to examine the LP experienced by students in distance education. In this respect, as a second dimension, the LP dimension of distance education was considered while determining the research hypotheses.

According to the demographic variables of the maritime faculty students, the research hypotheses were formed in relation to the technical dimension and the LP dimension of distance education, as well as to distance education in general. These hypotheses and the tests applied are presented in Table 2.

4. Methodology

4.1. Sample of the Study

The study was conducted on a population of students studying in the Maritime Transportation and Management Engineering (Deck) and Marine Engineering (Engine) departments of 10 public universities in Türkiye. The total number of students in this population was 4517, with 3133 enrolled in the deck department and 1384 in the engine department [25]. Among these universities, Ordu University (ODU), Recep Tayyip Erdoğan University (RTEU), and Dokuz Eylül University (DEU) were preferred in terms of accessibility, and questionnaires were sent to the maritime faculty students via Google Forms. The stratified random sampling method was used by randomly selecting students from three maritime faculties, which were stratified on a university basis.

The survey was conducted between August and October 2021, and 296 responses were collected. However, upon examining the responses, it was found that 62 students had given the same answer to all questions on the scale; therefore, these responses were excluded from the sample. After the eliminations, the number of data to be used for the analysis was determined as 234. Bartlett et al. [26] suggested that the sampling error for continuous data should be around 3%, and the number of samples required to represent the population with 95% confidence interval should be at 119. Based on these criteria, it can be concluded that the sample size of 234 was considered adequate for representing the population. Table 3 shows the demographic characteristics of the students after data cleaning.

Table 2. *Research hypotheses in this study*

Variable	Hypotheses	Test
Gender	H_{1-1}: There is a significant difference between the technical dimension averages according to students' gender.	T-test
	H_{1-2}: There is a significant difference between the learning process dimension averages according to students' gender.	
	H_{1-3}: There is a significant difference between the distance education evaluation averages according to students' gender.	
Ownership	H_{2-1}: There is a significant difference in the technical dimension averages according to the ownership of the device used by students.	T-test
	H_{2-2}: There is a significant difference in the learning process dimension averages according to the ownership of the device used by students.	
	H_{2-3}: There is a significant difference in the distance education evaluation averages according to the ownership of the device used by students.	
University	H_{3-1}: There is a significant difference in students' technical dimension averages according to their universities.	One-Way ANOVA
	H_{3-2}: There is a significant difference in students' learning process dimension averages according to their universities.	
	H_{3-3}: There is a significant difference in students' distance education evaluation averages according to their universities.	
Device	H_{4-1}: There is a significant difference in the technical dimension averages according to the type of device used by students during distance education.	One-Way ANOVA
	H_{4-2}: There is a significant difference in the learning process dimension averages according to the type of device used by students during distance education.	
	H_{4-3}: There is a significant difference in the distance education evaluation averages according to the type of device used by students during distance education.	
Region	H_{5-1}: There is a significant difference between the technical dimension averages according to the regions students live in during distance education.	One-Way ANOVA
	H_{5-2}: There is a significant difference between the learning process dimension averages according to the regions students live in during distance education.	
	H_{5-3}: There is a significant difference between the distance education evaluation averages according to the regions students live in during distance education.	
Class	H_{6-1}: There is a significant difference in the technical dimension averages according to students' classes.	One-Way ANOVA
	H_{6-2}: There is a significant difference in the learning process dimension averages according to students' classes.	
	H_{6-3}: There is a significant difference in the distance education evaluation averages according to students' classes.	
Grade	H_{7-1}: There is a significant relationship between students' technical dimension evaluations and their grade point averages.	Pearson correlation
	H_{7-2}: There is a significant relationship between students' learning process dimension evaluations and their grade point averages.	
	H_{7-3}: There is a significant relationship between students' distance education evaluations and their grade point averages.	
Technical - Learning process	H_{8-1}: There is a significant relationship between students' technical and learning process dimensions evaluations.	Pearson correlation

In the study sample, there were 118 (50.4%), 67 (28.6%), and 49 (20.9%) students from DEU, ODU, and RTEU, respectively. Out of a total of 234 students, 205 (87.6%) were male and 29 (12.4%) were female. In addition, 195 (83.3%) students were enrolled in the deck department, while 39 (16.7%) students were in the engine department. There was no engine student in the sample, except from DEU.

4.2. Data Collection Tool

The Distance Education Evaluation Scale (UEDO), developed by Özkul et al. [27], was used as the data collection tool. This scale consists of 2 dimensions, technical (6 items) and LP (9 items), and a total of 15 items. The items in the scale were presented using a five-point Likert type scale. The scoring of the answers given by the students was determined in the range of "1= totally disagree" and "5= totally agree" [27].

Table 3. *Demographic characteristics of the sample*

University		Gender		Department		Class				Total
		Male	Female	Deck	Engine	1st	2nd	3rd	4th	
DEU	N	96	22	79	39	58	31	10	19	118
	%	41.03%	9.40%	33.76%	16.67%	24.79%	13.25%	4.27%	8.12%	50.43%
RTEU	N	47	2	49	0	28	8	8	5	49
	%	20.09%	0.85%	20.94%	0.00%	11.97%	3.42%	3.42%	2.14%	20.94%
ODU	N	62	5	67	0	18	24	13	12	67
	%	26.50%	2.14%	28.63%	0.00%	7.69%	10.26%	5.56%	5.13%	28.63%
Total	N	205	29	195	39	104	63	31	36	234
	%	87.61%	12.39%	83.33%	16.67%	44.44%	26.92%	13.25%	15.38%	100.00%

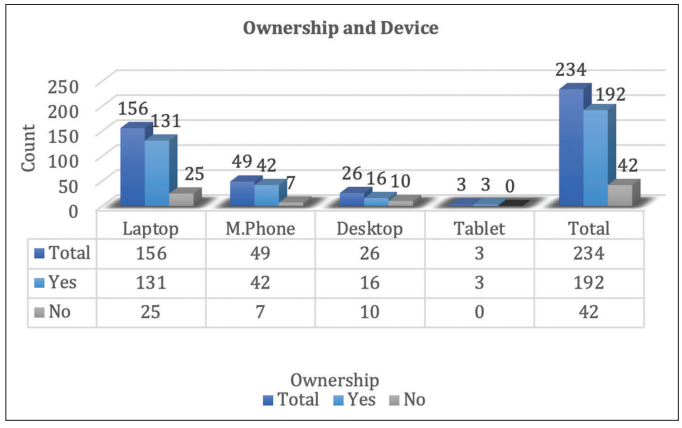

Figure 1. *Ownership and device statistics*

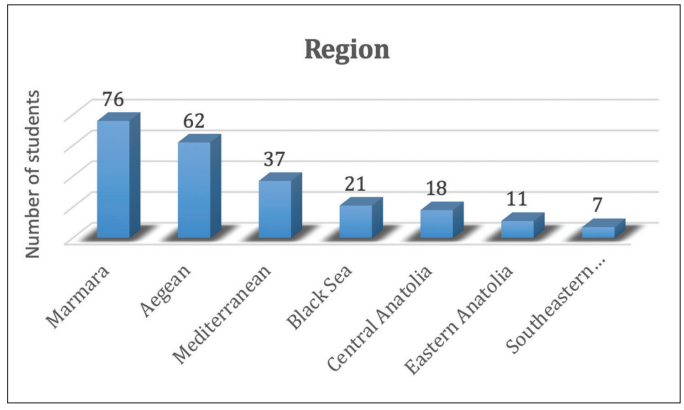

Figure 2. *Regions from which students participated in distance education*

UEDO was originally in Turkish and applied to students in Turkish. The Cronbach's alpha coefficients were 0.89, 0.96, and 0.96 for the technical (T) dimension, the LP dimension, and the total UEDO, respectively.

The other variables used in the first part of the questionnaire form were gender, department, university, class, grade point average (GPA), from which city they attended distance education, with which device they participated in distance education, and whether this device belonged only to them.

4.3. Data analysis

The SPSS 25 program was used for analyzing the collected data. Reliability test, exploratory factor analysis, independent samples t-test, One-Way ANOVA, and correlation tests were conducted for hypothesis testing.

5. Findings

5.1. Descriptive Statistics

Information about the devices used by the students to access the distance education classes is given in Figure 1. As can be seen, the most commonly used device was the laptop (156), followed by mobile phone (49), desktop computer (26), and tablet (3). While 192 students stated that these devices belonged only to them, 42 stated that they connected to distance education using a common device.

Figure 2 shows the number of students who participated in distance education from seven geographical regions in Türkiye. While the highest participation was recorded in the Marmara Region (76), the least participation was in the Southeastern Anatolia Region (7).

Marmara is the most populous region in Türkiye. This is followed by Central Anatolia (12.896.255), Mediterranean (10.584.506), Aegean (10.477.153), Southeastern Anatolia (8.576.391), Black Sea (7.696.132), and Eastern Anatolia (6.513.106) [28]. Looking at Figure 2, it can be seen that the population density of the regions and the number of students did not increase proportionally, which may be due to the fact that the students living in coastal areas preferred maritime faculty (Aegean: 62; Mediterranean: 37; Black Sea: 21).

5.2. Normality Results

Before proceeding to the hypothesis tests, whether the scale and its subdimensions were normally distributed was tested using skewness and kurtosis values. As shown in Table 4, the normality condition was met as all values were within ±2 limits [29].

Table 4. *Normality results of each dimension and total UEDO by variables*

Variable		Technical		Learning process		Total UEDO	
		Skewness	Kurtosis	Skewness	Kurtosis	Skewness	Kurtosis
Gender	Male	-0.834	0.078	0.292	-1.238	0.056	-0.902
	Female	-0.203	-0.634	1.162	0.336	0.772	-0.184
University	DEU	-0.832	0.005	0.581	-0.965	0.220	-0.738
	RTEU	-0.964	1.299	0.103	-1.290	0.006	-0.908
	ODU	-0.455	-0.647	0.230	-1.315	0.107	-1.121
Ownership	Yes	-0.804	0.007	0.308	-1.258	0.155	-1.000
	No	-0.391	-0.553	0.700	-0.614	0.147	-0.924
Device	Laptop	-0.982	0.723	0.371	-1.230	0.125	-0.886
	Desktop	-0.501	0.599	0.410	-1.063	0.331	-0.805
	Mobile Phone	-0.173	-1.095	0.468	-1.169	0.328	-1.065
Region	Marmara	-0.853	0.082	0.444	-1.038	0.142	-0.725
	Aegean	-0.866	0.863	0.309	-1.291	0.056	-0.986
	Mediterranean	-0.483	-0.971	0.459	-1.251	0.205	-1.114
	Others	-0.560	-0.125	0.365	-1.161	0.262	-0.805
Class	1st	-0.718	-0.164	0.474	-1.059	0.168	-0.709
	2nd	-0.539	-0.377	0.489	-1.175	0.320	-0.935
	3rd	-1.323	1.691	0.261	-1.166	0.238	-1.184
	4th	-0.975	0.872	0.121	-1.403	-0.111	-1.133
	Skewness			**Kurtosis**			
Grade	-0.782			1.775			
Technical	-0.757			-0.050			
Learning Process	0.372			-1.189			
Total UEDO	0.132			-0.912			

5.3. Reliability Test and Factor Analysis

Reliability analysis was performed to measure whether the scale was reliable on the applied sample. Looking at the Cronbach's alpha coefficients shown in Table 5, it can be seen that the scale is reliable (0.896, 0.974, 0.950>0.60) and suitable for exploratory factor analysis (EFA) (KMO 0.941>0.70; Bartlett's test 0.000<0.05). When the EFA results were examined, it is seen that the eigenvalues of two factors were greater than 1 (8.899, 2.676) and consisted of two dimensions as in UEDO. The technical dimension, LP dimension, and overall scale cumulatively explained 48.56%, 28.608%, and 77.168% of the variance.

5.4. Hypothesis Tests

All hypotheses and inferential tests are given in Table 2. Accordingly, a total of 22 hypotheses were established, and Independent Sample T-test, One-way ANOVA and Pearson Correlation tests were performed.

5.4.1. T-test

Table 6 shows the students' answers to UEDO according to their gender and whether the device they used belonged to them (ownership). A significant (p=0.031) difference was found when the averages of the distance education evaluation scores of the students were analyzed according to their gender. In particular, male students ($\bar{X}_{male}$=3.0872) evaluated distance education more positively than female students ($\bar{X}_{female}$=2.6483). This difference was also seen in the learning process dimension (p=0.013), in which male students scored higher than female students ($\bar{X}_{female}$=2.0077) with an average of 2.6531. However, this difference did not exist in the technical dimension (p=0.496).

When the students' answers to UEDO were examined, the results showed a significant difference (p=0.003) based on whether or not they owned the devices they used in distance education belonged. While this difference was also seen in the technical dimension (p=0.000), it was not observed in the LP dimension (p=0.168). Therefore, students who own the device they use while participating in distance education gave higher evaluation scores in terms of technical ($\bar{X}_{yes}$=3.8733, $\bar{X}_{no}$=3.0317) and total ($\bar{X}_{yes}$=3.1264, $\bar{X}_{no}$=2.6048) than students whose device does not belong to them.

Table 5. *Reliability test and factor analysis results*

N	Item	Technical	Learning process	Total UEDO
3	It is easy for me to reach the courses given by distance education.	0.886		
1	I can access the courses given by distance education whenever I want.	0.870		
2	I can access the courses given by distance education wherever I want.	0.827		
5	I use the preferred online platforms (zoom, discord, etc.) effectively in distance education	0.804		
4	I have information about the implementation schedule of the courses given by distance education.	0.780		
6	I get technical support when I have difficulties in accessing the courses given by distance education.	0.555		
12	Distance education facilitates my permanent learning.		0.935	
10	Distance education is suitable for my learning characteristics.		0.907	
15	Distance education enriches my learning process.		0.900	
11	Distance education process encourages me to learn new things.		0.895	
13	The lessons given by distance education contribute to my personal and professional development		0.885	
14	The instructional design of the lessons given by distance education is effective.		0.883	
8	Distance education process increases my learning motivation.		0.879	
7	Distance education is efficient in terms of learning processes.		0.861	
9	I evaluate my own learning process through distance education.		0.792	
	Cronbach's alpha	0.896	0.974	0.950
	Explained variance (%)	48.56	28.608	77.168
	Eigenvalue	8.899	2.676	
	KMO=0.941; Bartlett's test of Sphericity (p)=0.000			

Table 6. *T-test results of the distance education evaluations of students by gender and device ownership*

Dimension	Variable	N	$\bar{X}$	SD	t	p	Result
	Gender						
Technical	Male	205	3.738	0.957	0.691	0.496	Not Supported
	Female	29	3.609	0.934			
Learning Process	Male	205	2.653	1.305	2.512	**0.013**	Supported
	Female	29	2.008	1.227			
Total UEDO	Male	205	3.087	1.030	2.171	**0.031**	Supported
	Female	29	2.648	0.936			
	Ownership						
Technical	Yes	192	3.873	0.872	5.496	**0.000**	Supported
	No	42	3.032	1.015			
Learning Process	Yes	192	2.628	1.323	1.385	0.168	Not Supported
	No	42	2.320	1.234			
Total UEDO	Yes	192	3.126	1.008	3.034	**0.003**	Supported
	No	42	2.605	1.016			
N: Number, $\bar{X}$: Mean, SD: Standard deviation							

5.4.2. One-Way ANOVA

In Table 7, One-Way ANOVA test results of the distance education evaluations of the students according to university, device, region, and class variables are given. Accordingly, there were no significant differences between students' university and distance education evaluations

Table 7. *One-Way ANOVA test results of the distance education evaluations of students by university, device, region, and class variables*

Dimension	Variable	N	$\bar{X}$	SD	F	p	Post-hoc	Result
	UNIVERSITY							
Technical	DEU	118	3.698	0.989	1.565	0.211		Not Supported
	RTEU	49	3.925	0.832				
	ODU	67	3.617	0.964				
Learning Process	DEU	118	2.466	1.295	0.831	0.437		Not Supported
	RTEU	49	2.721	1.317				
	ODU	67	2.653	1.334				
Total UEDO	DEU	118	2.959	1.028	0.978	0.377		Not Supported
	RTEU	49	3.203	0.968				
	ODU	67	3.039	1.066				
	DEVICE							
Technical	Laptop	156	3.892	0.886	12.981	**0.000**	**Tamhane's T2**	Supported
	Desktop	26	3.737	0.762			MP-L p = 0.000	
	Mobile Phone	49	3.136	1.033			MP-D p = 0.017	
Learning Process	Laptop	156	2.614	1.330	1.004	0.368		Not Supported
	Desktop	26	2.726	1.208				
	Mobile Phone	49	2.342	1.324				
Total UEDO	Laptop	156	3.125	1.015	4.066	**0.018**	**LSD** MP-L p = 0.006	Supported
	Desktop	26	3.131	0.916				
	Mobile Phone	49	2.660	1.068				
	REGION							
Technical	Marmara	76	3.680	0.989	2.754	**0.043**	**Tamhane's T2** A-O p = 0.019	Supported
	Aegean	62	3.989	0.756				
	Mediterranean	37	3.604	1.142				
	Others	57	3.523	0.911				
Learning Process	Marmara	76	2.513	1.258	0.370	0.775		Not Supported
	Aegean	62	2.661	1.317				
	Mediterranean	37	2.393	1.288				
	Others	57	2.595	1.359				
Total UEDO	Marmara	76	2.980	1.016	0.928	0.428		Not Supported
	Aegean	62	3.192	0.951				
	Mediterranean	37	2.877	1.096				
	Others	57	2.966	1.038				
	CLASS							
Technical	1st	104	3.788	0.956	2.324	0.076		Not Supported
	2nd	63	3.479	1.004				
	3rd	31	3.978	0.811				
	4th	36	3.736	0.916				
Learning Process	1st	104	2.516	1.299	1.268	0.286		Not Supported
	2nd	63	2.402	1.347				
	3rd	31	2.875	1.266				
	4th	36	2.778	1.300				
Total UEDO	1st	104	3.025	0.979	1.790	0.150		Not Supported
	2nd	63	2.833	1.111				
	3rd	31	3.316	0.942				
	4th	36	3.161	1.045				

N: Number; $\bar{X}$: Mean; SD: Standard Deviation; L: Laptop; D: Desktop; MP: Mobile Phone; A: Aegean; O: Others

not only in total UEDO but also in both dimensions. Furthermore, students' distance education evaluations did not change according to their universities (p_{TTL}=0.377, p_{T}=0.211, p_{LP}=0.437).

In terms of the type of device used to participate in distance education, we can see that three students chose the tablet option. These cases were excluded from the sample while performing the ANOVA test, as sufficient data could not be obtained for us to make comparisons between groups. Meanwhile, we found a significant difference between at least two groups in distance education evaluations according to the type of device used by the students (p=0.018). As the test of homogeneity of variances resulted in a value of 0.430, the results of the LSD test were checked. According to test results, a significant difference was found between those who connected to distance education by mobile phone and by laptop (p_{MP-L}=0.006). Furthermore, those who used a mobile phone ($\bar{X}_{MP}$=2.6599) evaluated it more negatively than those who used a laptop ($\bar{X}_{L}$=3.1252).

While it was determined that the students' evaluations of the LP dimension did not change according to the type of device they used (p=0.368), the averages of the technical dimension evaluations showed a significant difference between at least two groups (p=0.000). In particular, significant differences were found between those who attended to distance education by mobile phone and both by laptops and desktop computers (p_{MP-L}=0.000, p_{MP-D}=0.017). According to the average scores, those who attended the lessons using laptops ($\bar{X}_{L}$=3.8921) and desktop computers ($\bar{X}_{D}$=3.7372) made more positive evaluations than those who attended using mobile phones ($\bar{X}_{MP}$=3.1361).

Before looking at the evaluation scores of the students according to the geographical regions they lived in, Black Sea, Central Anatolia, Eastern Anatolia, and Southeastern Anatolia regions with a small sample number were combined as "Others". A significant difference was found between the geographical regions from which the students participated in distance education in terms of the technical dimension (p=0.043). As the Levene test result was p=0.017, the result of Tamhane's T2 test was checked. Accordingly, the students participating in distance education from the Aegean Region made more positive evaluations than those in the geographical regions grouped as "Others" (p=0.019, $\bar{X}_{A}$=3.9892, X_{O}=3.5234). Furthermore, in the distance education evaluations according to the students' classes, no significant difference was found in the total and the both dimensions (p_{T}=0.076, p_{LP}=0.286, p_{TTL}=0.150).

5.4.3. Correlation

Table 8 shows the correlation results between students' GPAs and distance education evaluations. In addition, the relationships between the subdimensions of the scale were examined. A positive, significant, and weak relationship was found between students' distance education evaluations and their GPAs (r=0.154, p=0.019). In other words, as students' GPAs' increased, their evaluations of distance education became more positive. In addition, a positive, significant, and weak relationship was found between students' grade and technical dimension evaluations (r=0.228, p=0.001).

Furthermore, there was a positive, moderate, and significant correlation between the subdimensions of the scale (r=0.486, p=0.000). In other words, as the students made positive assessments of the technical dimension, they also made positive assessments of the LP dimension.

6. Discussion

Based on the given statistical analysis, there are several significant findings related to the evaluations of distance education made by the students. First, there was a significant difference in the evaluation scores between male and female students, with the former making more positive evaluations of distance education than the latter. In parallel with this finding, Aksoğan [7] also found that male respondents held a more positive stance toward distance education than female respondents.

Second, the students who owned the device they used for distance education gave higher evaluation scores in terms of the technical dimension and the total scale compared with those who did not own the devices they were using. If the devices used by the students belonged to them, this situation would enable them to access distance education whenever and wherever they wanted. Similar to this finding, İnce et al. [22] found that students who owned a computer

Table 8. *Correlations between students' grade point averages and distance education evaluations*

	$\bar{X}$	SD	Grade	T	LP	Total UEDO
Grade	3.036	0.461	1	**0.228****	0.090	**0.154***
T	3.722	0.953		1	**0.486****	**0.743****
LP	2.573	1.310			1	**0.946****
Total UEDO	3.033	1.027				1
**<0.01, *<0.05, T: Technical dimension, LP: Learning process dimension, $\bar{X}$: Mean, SD: Standard deviation						

were more likely to participate in all questionnaire items compared to those who did not have their own computers.

Meanwhile, there was no significant difference in the learning process dimension according to the device ownership. Thus, students' motivation to learn and their contribution to their personal and professional development did not change with the ownership of the equipment.

Regarding the university and class variables, there were no significant differences in the total and dimension evaluation scores. The universities considered in this study may have used similar educational materials and learning resources in the distance education process. In addition, students' self-study and motivation levels gained importance in the distance education process. Differences regarding the universities and classes may be insignificant depending on how the students approached this process and how motivated they were. Unlike the findings in the present study, Çırakoğlu and Özbay [19] found a significant relationship between dental students' classes and scale expressions in their study.

In terms of location, for the technical dimension, the students from the Aegean Region had more positive evaluations than those in the "Others" group. Distance education requires a computer or other devices with which students can access the Internet. In this regard, students in the Aegean Region may have more opportunities. This situation, in comparison, may lead to lower evaluation scores of students from other regions.

There were significant differences in the technical dimension evaluation scores based on the type of device used by the students. Students who used laptops or desktops evaluated distance education more positively than those who used mobile phones. Mobile phones generally have less powerful processors and smaller screens. Therefore, it may be more difficult for students to view and access distance education materials using their mobile phones. Furthermore, Internet connection problems may be more common for mobile phones, which can negatively affect students' attendance.

Finally, we found a positive correlation between students' GPAs and their evaluation scores of distance education. Students with higher GPAs may be more disciplined and have regular study habits. This situation may continue in the same way during distance education as in face-to-face education. In addition, there was a positive correlation between the technical and LP dimensions of the scale.

Overall, these findings reveal that certain factors such as students' gender, device ownership, type of device, and academic success are related to distance education evaluations.

7. Conclusion

During the COVID-19 pandemic, many countries had to urgently switch from face-to-face education to distance education. Students in all departments of many universities continued their education through distance education. Those who were enrolled in the deck and engine departments of maritime faculties, where applied courses (simulator-assisted courses, etc.) are important, also had to keep up with this situation.

The maritime industry is an essential sector for global trade and transportation, and maritime faculties play a critical role by training students as qualified personnel for this industry. Thus, any disruptions to maritime education can have far-reaching consequences for the industry and its stakeholders, given that distance education may not offer the same level of hands-on experience as face-to-face education. This could mean that students may not have the opportunity to gain practical experience in navigating a ship or working with actual maritime equipment. In this context, it is important to examine maritime students' evaluations of distance education. This study reveals the evaluations of students enrolled in three different maritime faculties in Türkiye.

Study Limitations

In terms of limitations, this study reached fewer engine students than deck students. Thus, more engine students can be included, and comparisons between deck and engine departments can be made in future studies. In addition, a more comprehensive study can be performed by including more maritime faculties. This study can also be improved by including students in the maritime faculties of private universities in the sample. Comparisons can also be made between maritime faculties in public and private universities. Apart from these, studies can also investigate how distance education affects the applied courses of maritime students.

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References

[1] T. Muthuprasad, S. Aiswarya, K. S. Aditya, and G. K. Jha, "Students' perception and preference for online education in India during COVID-19 pandemic," *Social Sciences & Humanities Open,* vol. 3, 100101, 2021.

[2] A. E. Al Lily, A. F. Ismail, F. M. Abunasser, and R. H. A. Alqahtani, "Distance education as a response to pandemics: Coronavirus and Arab culture," *Technology in Society,* vol. 63, 101317, 2020.

[3] F. Avcı, and E. C. Akdeniz, "Assessment of teachers on the Covid-19 epidemic and problems encountered in distance learning process," *International Journal of Social and Educational Sciences,* vol. 3, pp. 117-154, 2021.

[4] M. Çokyaman, and M. Ünal, "Distance education perceptions of students and teachers during covid-19 epidemic: A metaphor analysis," *OPUS International Journal of Society Researches,* vol. 18, pp. 1684-1715, July 2021.

[5] Ö. Akdemir, "Distance education in Turkish higher education," *Journal of Higher Education and Science,* vol. 1, pp. 69-71, Aug 2011.

[6] Y. Şeker, "A study on students' views about distance education system and distance accounting teaching in the covid-19 pandemic process," in *Scientific Approaches and Researches in Accounting Issues*, Ş. Karabulut, Ed., Ankara, 2021, pp. 345-375.

[7] M. Aksoğan, "Opinions of students about distance education in the pandemi process," *NATURENGS*, Special Issue, pp. 1-9, Nov 2020.

[8] P. Chakraborty, P. Mittal, M. S. Gupta, S. Yadav, and A. Arora, "Opinion of students on online education during the covid-19 pandemic," *Human Behavior and Emerging Technologies,* vol. 3, pp. 357-365, July 2021.

[9] L. M. Dinu, et al. "Student perceptions of online education during Covid-19 lockdowns: Direct and indirect effects on learning," *Education Sciences,* vol. 12, pp. 813, Nov 2022.

[10] G. Savaş, "University students' perceptions of their distance education experience during the covid-19 pandemic," *Journal of Higher Education,* vol. 11, pp. 309-320, 2021.

[11] N. Kartallıoğlu, "Views of the students learning Turkish as a foreign language on distance education during the COVID-19 pandemic," *Participatory Educational Research,* vol. 9, pp. 71-91, July 2022.

[12] Slamet, A. M. K. Amrullah, Sutiah, and A. Ridho, "Differences in the experience of lecturers and students on distance learning in higher education in Indonesia: Case study in the pandemic of Covid-19," *Systematic Reviews in Pharmacy,* vol. 12, pp. 742-747, Jan 2021.

[13] D. Baykal, and S. K. Tutuncu, "Online education experiences of the students studying in health care departments during the covid-19 pandemic," *Turkish Online Journal of Distance Education,* vol. 23, pp. 131-143, Jan 2022.

[14] C. Nordqvist, "Studying English through distance education: Swedish university students' views on distance learning during the covid-19 pandemic," Degree project, Mälardalen University, School of Education, Culture and Communication, Sweden, 2022.

[15] M. M. Karaaslan, İ. Çelik, Ş. Kurt, A. Y. Yavuz, and M. Bektaş, "Undergraduate nursing students' experiences of distance education during the COVID-19 pandemic," *Journal of Professional Nursing,* vol. 38, pp. 74-82, Jan-Feb 2022.

[16] T. Alasmari, "Learning in the COVID-19 era: Higher education students and faculty's experience with emergency distance education," *International Journal of Emerging Technology in Learning,* vol. 16, pp. 40-62, May 2021.

[17] L. P. Dinh, and T. T. Nguyen, "Pandemic, social distancing, and social work education: Students' satisfaction with online education in Vietnam," *Social Work Education,* vol. 39, pp. 1074-1083, Sep 2020.

[18] K. B. Bataineh, M. S. Atoum, L. A. Alsmadi, and M. Shikhali, "A silver lining of coronavirus: Jordanian universities turn to distance education," *International Journal of Information and Communication Technology Education,* vol. 17, pp. 138-148, 2021.

[19] N. Y. Çırakoğlu, and Y. Özbay, "Evaluation of distance learning and online exam experience of Turkish undergraduate dental students during the Covid-19 pandemic," *Nigerian Journal of Clinical Practice,* vol. 25, pp. 916-922, 2022.

[20] R. Zaharia, R. M. Zaharia, T. Edu, and I. C. Negricea, "Exploring student satisfaction with online education during the covid-19 pandemic in Romania: A logistic regression approach," *Transformations in Business & Economics,* vol. 21, pp. 41-62, 2022.

[21] T. Chen, L. Peng, X. Yin, J. Rong, J. Yang, and G. Cong, "Analysis of user satisfaction with online education platforms in China during the COVID-19 pandemic," *Healthcare*, vol. 8, pp. 200, July 2020.

[22] E. Y. İnce, A. Kabul, and İ. Diler, "Distance education in higher education in the covid-19 pandemic process: A case of Isparta Applied Sciences University," *International Journal of Technology in Education and Science,* vol. 4, pp. 343-351, 2020.

[23] M. Adnan, and K. Anwar, "Online learning amid the COVID-19 pandemic: Students' perspectives," *Journal of Pedagogical Sociology and Psychology,* vol. 2, pp. 45-51, 2020.

[24] A. E. P. Atmojo, and A. Nugroho, "EFL classes must go online! Teaching activities and challenges during covid-19 pandemic in Indonesia," *Register Journal,* vol. 13, pp. 49-76, 2020.

[25] The Council of Higher Education, "Higher Education Program Atlas," [Online]. Available: https://yokatlas.yok.gov.tr. [Accessed: March 28, 2023].

[26] J. E. Bartlett, J. W. Kotrlik, and C. C. Higgins, "Organizational research: Determining appropriate sample size in survey research," *Information Technology, Learning, and Performance Journal,* vol. 19, pp. 43-50, 2001.

[27] R. Özkul, D. Kırnık, O. Dönük, Y. Altunhan, and Y. Altunkaynak, "Teachers' views on distance education applications: Scale study," *Turkish Studies,* vol. 15, pp. 3655-3667, 2020.

[28] Ministry of Interior, "Turkey's Population Map," icisleri.gov.tr, July 10, 2021. [Online]. Available: https://www.icisleri.gov.tr/turkiyenin-nufus-haritasi-10072021. [Accessed: Jan. 16, 2023].

[29] D. George, and P. Mallery, *IBM SPSS Statistics 26 Step by Step: A Simple Guide and Reference*. Routledge, 2019.