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Distance Education Satisfaction in Higher Education Students During COVID-19 Pandemic: A Survey

COVID-19 Pandemi Sürecinde Yükseköğretim Öğrencilerinin Uzaktan Eğitim Memnuniyeti: Bir Araştırma

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Özet

Araştırmanın amacı, Türkiye'de öğrencilerin demografik ve sosyoekonomik durumları ile uzaktan eğitime ilişkin memnuniyetleri arasındaki ilişkiyi incelemektir. Veri toplama aracı olarak, üniversite öğrencilerinin pandemi süreci nedeniyle sunulan uzaktan eğitime ilişkin görüşlerini değerlendirmek amacıyla bir anket formu oluşturulmuş ve kullanılmıştır. Değişkenler arasındaki ilişkilerin anlamlılığını araştırmak için dört farklı model kullanılmıştır. Uzaktan eğitimin bireysel memnuniyet düzeyleri ile ilişkili faktörleri belirlemek için sıralı lojistik regresyon, sıralı probit regresyon, genelleştirilmiş sıralı lojistik regresyon ve genelleştirilmiş sıralı probit regresyon kullanılmıştır. Uygulanan yöntemler arasında en iyi model genelleştirilmiş sıralı lojistik regresyon modeli olarak belirlenmiştir. Bu modelle elde edilen diğer sonuçlar, cinsiyet, statü, yaş, derslik, medeni durum, üniversitedeki konum, bilgisayar kullanım düzeyi, anne ve babanın eğitim düzeyi ve üniversitenin bulunduğu yer değişkenlerinin uzaktan eğitime ilişkin memnuniyet üzerinde etkili olduğu belirlenmiştir. Bu çalışmanın ortaya koyduğu ve öğrencilerin aldıkları eğitimden memnuniyetleri açısından aralarında anlamlı ilişki bulunan değişkenler dikkate alınarak uygun eğitim teknikleri üzerine eğitim politikalar geliştirilmelidir.

Anahtar Sözcükler: Uzaktan Eğitim, Yükseköğretim Öğrencileri, Öğrenci Memnuniyeti, Genelleştirilmiş Sıralı Modeller

Abstract

The primary aim of the study was to investigate the relationship between the demographic and socioeconomic conditions of students and their satisfaction regarding distance education in Türkiye. As data collection tool, a questionnaire form was created and used in order to assess the opinions of university students about distance education offered due to pandemic process. Four different models were used to investigate the significance of the relationships between the variables. Ordered logistic regression, ordered probit regression, generalized ordered logistic regression, and generalized ordered probit regression were used to determine the factors associated with the individual satisfaction levels of distance education. According to the model comparison criteria, generalized ordered logistic regression produced the best model. Further results generated by this model indicated that gender, status, age, schoolroom, marital status, location at the university, level of computer use, father's and mother's education level, and the university location variables had an effect on satisfaction regarding distance education. The present study determined the relationship between several factors regarding the university students, including marital status, age, income level, the region of the university, and their level of computer use, and their satisfaction level with regards to the distance education. Appropriate educational techniques should be emphasized by considering the variables that this study reveals and that have a significant relationship between them in terms of students' satisfaction with the education they receive.

Keywords: Distance Education, Higher Education Students, Student Satisfaction, Generalized Ordered Models.

Over the last four decades, the educational technology research field has grown due to a highly specialized field. The distance education program has also taken its own place within this technology. Distance education is practiced in all parts of the world to provide study opportunities for those who cannot take part in classrooms in person. Also, some equate distance learning with a private review of recommended texts with or without specific study guides. For others, distance learning is a teaching-learning system that includes tailored study materials and regular, mediated contacts between students and teachers delivered individually or in groups (Jegede & Kirkwood, 1994). Most studies states that one or more technologies are used to provide instructions to students who are separated from the instructor and to support regular and substantive interaction between the students and the instructor in a synchronously or asynchronous manner. After this finding, several studies have investigated the technologies used in online learning, as well as their effects. It was found that the most important factor influencing the preparedness for distance education was learning (Clark, 2020).

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In a country where the learning factor is important, education has almost come to a standstill with the coronavirus disease (COVID-19) affecting the world. During the fight against the outbreak of the Coronavirus disease (COVID-19) in 2019, countries have replaced traditional in-person education with distance education as a means of educational salvation. For this purpose, governments have made investments on distance education. The said education expense covers expenditure on schools, universities and other public and private educational institutions (OECD, 2018). In this context, countries have started to allocate additional budgets to develop distance education infrastructure.

There are many studies in the domestic and foreign literature about the definition and content of distance education. Distance education can be defined as the process of teaching and learning assisted by telecommunication systems of globally interconnected technologies via devices such as computers, iPads and mobile phones (Isman, 1996). A sincerity exists between teachers and student in distance education, therefore; the student is expected to take a high level of responsibility in order for the learning program to be conducted in the best manner. A student needs a certain level of assistance from the teacher during self-learning. Some adults, however, need help to formulate their learning objectives and to identify sources of information when learning (Simonson et al., 1999). For adult learners, it is neither appropriate to plan an educational program on the basis of perceived needs, nor is it appropriate to plan a program entirely according to the needs anticipated by others.

When the studies conducted in this field are examined, it is seen that many studies (Al Lily et al., 2020; Taylor et al., 2020) have been conducted on students in order to examine the effect of distance education. A recent study (Muthuprasad et al., 2021) found that while the flexibility makes students' online classes more interesting, internet connection issues in rural areas may become problematic for students receiving distance education. Eygü and Karaman's (2013) results indicated that students have different points of view on distance education, which is significantly affected by the demographic factors. As shown in the study, the factors influencing the preparedness for distance education were learning strategies. These factors, student characteristics and perceptions (Tsai et al., 2021; Cole et al., 2021; Hockridge, 2013), motivation for learning (Hough, 1984; Fırat et al., 2018; Avila et al., 2021; Almaleki et al., 2021; Hernawati et al., 2021; Göksu et al., 2021), student satisfaction (Landrum et al., 2021; Wang et al., 2021), technology self-efficacy (Aguilera-Hermida, 2020; Aguilera-Hermida et al., 2021; Hamdan et al., 2021), learning material (McGann et al., 2021; Söğütlü, 2021; Stradiotová et al., 2021). In addition, technology is a tool through which many interpersonal communications among students occur during the process of distance education (Salakhova et al., 2020).

It has been documented by multiple previous studies (Gunawardena & Mclsaac, 2013; Yuliansyah and Ayu, 2021; Bakhov et al., 2021) that students have perceptions both in favor of and against online learning. Also, some studies (Markova et al., 2017; Cicha et al., 2021) found that the distance education decreases student expectation. Accordingly, it was aimed to provide information about the study and to create a study guide for the course produced in distance education, and for students to experience distance education (Martin et al., 2019).

A study showed that there are individual differences among students in response to distance education and its various techniques, as for classroom teaching, particular teaching styles, and even particular teachers (Moore, 1989). Kuo et al. (2014) stated that distance education is not related to student satisfaction, nor does it predict the student satisfaction. One recent study (Neroni et al., 2019) suggested that student's individual achievements are affected by online learning. Therefore, having an independent learning style has an important effect on students' success in the distance education process (Simonson et al., 2015).

The COVID-19 pandemic has affected the education system in many countries, causing some mandatory changes in the way education is implemented, and in this context, Türkiye has switched to distance education instead of the traditional face-to-face education. Gerçek et al. (2023) compared university students who received distance or hybrid education during the pandemic process. As a result of the research, it was determined that the hybrid education model was more advantageous than the distance education model for these courses. In a similar study (Arslan & Yilmaz, 2022), it was found that the education given according to the role of the educator and the level of the student would be more effective. In addition, it was also determined that the support services provided, learning conditions, evaluation system in distance education, and program effectiveness were important on distance education course satisfaction (Buluk & Eşitti, 2020). In another study, it was determined that the student's internalization of distance education, that is, responding to one's expectations, affects perceived learning satisfaction (Eygü & Eygü, 2022). As a result, Dindar et al. (2022) revealed that distance education students in Türkiye faced many challenges during the pandemic process.

Previous studies have extensively investigated the possible effect of distance education. A considerable amount of papers have also highlighted the potential gap in the literature regarding online learning. However, there are few studies conducted on understanding student expectations and preferences in the context of Türkiye. With our study, we try to fill this gap by conducting a literature review to determine independent variables and identifying the factors related to distance education.

Method

Research Design

The study was designed with descriptive and cross-sectional quantitative research methods. We used four statistical models in the study, which are ordered logistic regression, ordered probit regression, generalized ordered logistic regression and generalized ordered probit regression. These quantitative methods enable us to determine the level of student satisfaction regarding distance education at universities. Student satisfaction results were interpreted within the scope of these four models, which contributed to the field in a different dimension. These models are advantageous in that they estimate the relationship between a continuous dependent variable, which can take two values, and several explanatory (independent) variables and show which explanatory variables have a strong predictive effect on the dependent variable. We have also used these qualitative methods to interpret the data obtained in the questionnaires. Descriptive statistics methods were used for a systematic analysis of the collected data.

Sample/Participants

The study was designed as a cross-sectional quantitative research. Students studying at state universities in Türkiye participated in the study. In this study, stratified random sampling method was used based on simple random sampling method. The number of students enrolled in public universities in Türkiye for 2021-2022 was determined as 7,791,280 (Council of Higher Education). A total of 5574 students who volunteered to participate in the study were included in the sample. Accordingly, the estimator of the population mean was intended to have a lower variance. This objective refers to a statistical goal in a sampling or estimation process. The aim is to estimate the population mean with as little error or variability as possible. That is, a lower variance means that the estimate is closer to the population mean (more precise and reliable predictions, better data sampling or modeling, data consistency and reliability). The questionnaire was applied to students between the dates of January 1st and April 30th, 2021. The study was carried out in this specific time period because the first case in Türkiye was seen in March 2020, and distance education started in the whole country due to restrictions. Universities were expected to eliminate their infrastructure deficiencies regarding distance education until January 2021, and we have sought to fully determine student satisfaction in distance education at universities that completed the said process. The participants were informed about the purpose, objectives, and the structure of the study. Participating students were assured that no particular aspect or circumstance of the questionnaire's qualifications would influence their answers. In this context, ethics committee and permission letters were sent to the universities included in the sample and the participation of students was ensured.

Data Collection Process

In the present study, a questionnaire form developed by Eygü & Karaman (2013) was used to determine the opinions of university students about distance education offered due to the COVID-19 pandemic. Domestic and foreign literature (Garrison & Shale, 1987; Evans & Nation, 1993; Holt & Thompson, 1998; Haznedar & Baran, 2012) was reviewed and factor analysis was performed while preparing the questionnaire (Menchaca & Bekele, 2008), which includes effectiveness, learning, program evaluation, technology, materials and support services. No face-to-face interviews were held due to pandemic restrictions. For this reason, the questionnaire was transformed into an online questionnaire with a link shared with the students.

With the Türkiye education research, the study aims to obtain information about the education factor, which is among the factors that show the development levels of countries, and the satisfaction levels of students regarding distance education. In addition to reflecting the country in general, the present study is important in terms of enabling making international comparisons and shedding light on national needs.

Data Analysis

The dependent variable in this study was satisfaction level regarding distance education. This variable was measured with the question, "Are you satisfied with distance education in general?", where the answer was a Likert-type options as "not satisfied at all, not satisfied, middle, satisfied, completely satisfied".

A literature review was conducted to determine independent variables in the study, in which factors related to sociodemographic and impact indicators on distance education were taken. These variables were sociodemographic factors including gender, age, schoolroom, marital status, education level, monthly income, branch of science, and university location. Average monthly family income and average monthly spending variables constituted the economic factors.

We defined ordinal and nominal variables as dummy variables with the purpose of observing the effects of all variable categories that are included into an ordered logistic regression, an ordered probit regression, a generalized ordered logistic regression, and a generalized ordered probit regression model (Eygu & Gulluce, 2017).

IBM SPSS Statistics 20 and Stata 16 were used for data analyses. Primarily, we obtained the frequency values and rates of the students on their satisfaction regarding distance education. Then, we performed a Chi-square independence test to examine the relationship between the independent variables and satisfaction regarding distance education.

Subsequently, we specified the factors that related to the satisfaction regarding distance education by using the said four analyses of ordered logistic regression, an ordered probit regression, a generalized ordered logistic regression, and generalized ordered probit regression. These models are preferred because they are statistical models that offer differences in the use of ranking instead of binary classification, distributional assumptions (ignoring the normal distribution), estimation methods and interpretation.

The said four analyses were conducted in order to determine the factors affecting the distance learning satisfaction of students. We also performed a test to see if there was a multicollinearity among the independent variables included in the ordered regression model. To test a possible multicollinearity between the variables of the model, the VIF values of the independent variables were examined (Eygü & Kılınç, 2019) and it is stated that there is a multicollinearity problem between the independent variables for those with VIF values 5 or more. Çelik et al. (2014) indicated that variables which that have VIF values more than 10 are problematic in terms of multicollinearity, as they lead to biased results. In this study, no variable causing multicollinearity problem was found among the variables.

Findings

Descriptive Statistics and Chi-Square Test

The findings related to factors that may be affecting university students' distance learning process in Türkiye are shown in Table 1. While 66.2% of our sample population is female, 36% of the students are between the ages of 19-20. While 35.7% of the students are freshmen, 93.6% of them are single. While the fathers of 32.4% of the students were elementary school graduates, 42.5% of the mothers were elementary school graduates. 33.6% of our students were from department of social sciences, 17.3% from department of science, 18.6% from department of health, 24.5% from department of education, 3.3% from department of fine arts, and 2.6% from department of sports. As shown in Table 1, 8.2% of the families had a monthly average income of ₺5001-6000, 54.6% had place residence in the city, 24.7% father were retired, and 56.2% of the participating students had moderate level of computer use.

Model Estimation

All demographic variables were included as independent variables in the model, because it was assumed that the demographic variables of the questionnaire could directly or indirectly influence the satisfaction of the students. Descriptive statistics for these variables are given in Table 1.

Table 1.
Frequency and percentage of sociodemographic factors according to distance education status.

Variables	n (%)	Not Satisfied (n = 3326)	Somewhat Satisfied (n = 774)	Satisfied (n = 1474)	Chi-square test
Gender					
Female	3689 (66.2%)	2252 (68%)	542 (70%)	895 (62%)	0.000a
Male	1885 (33.8%)	1074 (32%)	232 (30%)	549 (38%)	
Age					
17-18	468 (8.4%)	324 (10%)	71 (9%)	73 (5%)	0.000a
19-20	2007 (36%)	1330 (40%)	309 (40%)	368 (25%)	
21-22	1809 (32.5%)	1136 (34%)	238 (31%)	435 (30%)	
23-24	725 (13%)	357 (11%)	92 (12%)	276 (19%)	
25-26	211 (3.8%)	76 (2%)	27 (3%)	108 (7%)	
27+	354 (6.4%)	103 (3%)	37 (5%)	214 (14%)	
Schoolroom					
1. class	1989 (35.7%)	1251 (38%)	322 (41%)	416 (28%)	0.000a
2. class	1175 (21.1%)	739 (22%)	160 (21%)	276 (19%)	
3. class	961 (17.2%)	599 (18%)	115 (15%)	247 (17%)	
4.+	1449 (26%)	737 (22%)	177 (23%)	535 (36%)	
Marital status					
Single	5320 (93.6%)	3264 (98%)	756 (98%)	1300(88)	0.000a
Married	254 (6.4%)	62 (2%)	18 (2%)	174 (12%)	

Father's education level					
Illiterate/literate but without any school	206 (3.7%)	137 (%4)	23 (3%)	46 (3%)	0.000a
Elementary school	1805 (32.4%)	1110 (33%)	258 (33%)	437 (30%)	
Primary education/secondary school/ vocational secondary school	1090 (19.6%)	668 (20%)	166 (21%)	256 (17%)	
High school and high school equivalent	1426 (25.6%)	851 (26%)	190 (25%)	385 (26%)	
College/faculty/master/PhD	1047 (18.7%)	560 (17%)	137 (18%)	350 (24%)	
Mother's education level					
Illiterate/literate but without any school	753 (13.5%)	475 (14%)	94 (12%)	184 (13%)	0.000a
Elementary school	2369 (42.5%)	1440 (43%)	362 (47%)	567 (38%)	
Primary education/secondary school/ vocational secondary school	990 (17.8%)	597 (18%)	136 (18%)	257 (17%)	
High school and high school equivalent	941 (16.9%)	535 (16%)	112 (15%)	294 (20%)	
College/faculty/master/PhD	521 (9.3%)	279 (9%)	70 (8%)	172 (12%)	
University location					
East Anatolia region	861 (15.4%)	518 (16%)	139 (18%)	204 (14%)	0.018b
Central Anatolia region	813 (14.6%)	505 (15%)	105 (14%)	203 (14%)	
Black Sea Region	520 (9.3%)	293 (8%)	78 (10%)	149 (10%)	
The Mediterranean region	911(16.3%)	520 (16%)	121 (16%)	270 (18%)	
Aegean region	734 (13.2%)	444 (13%)	88 (11%)	202 (14%)	
Marmara region	1184(21.2%)	700 (21%)	158 (20%)	326 (22%)	
Southeastern Anatolia region	551 (9.9%)	346 (11%)	85 (11%)	120 (8%)	
What is your department?					
Social	1873 (33.6%)	1092 (33%)	260 (34%)	521 (35%)	0.000a
Science	963 (17.3%)	578 (17%)	107 (14%)	278 (19%)	
Health	1038 (18.6%)	661 (20%)	168 (22%)	209 (14%)	
Education	1367 (24.5%)	806 (24%)	184 (23%)	377 (26%)	
Fine Arts	186 (3.3%)	105 (3%)	34 (4%)	47 (3%)	
Sport	147(2.6%)	84 (3%)	21 (3%)	42 (3%)	
Where is your accommodation at the university?					
Government dorm	1031 (18.5%)	700 (21%)	124 (16%)	207 (14%)	0.000a
Private dormitory	294 (5.3%)	178 (5%)	38 (5%)	78 (5%)	
Home with friend	457(8.2%)	421 (13%)	93 (12%)	181 (12%)	
With my family	3497 (62.7%)	1998 (60%)	508 (66%)	991 (67%)	
With cousins	295 (5.3%)	29 (1%)	11 (1%)	17 (%1)	
Household size					
1-3	1073 (19.3%)	534 (16%)	136 (18%)	403 (27%)	0.000a
4-6	3639 (65.3%)	2333 (67%)	505 (65%)	901 (61%)	
7+	862 (15.5%)	559 (17%)	133 (17%)	170 (12%)	
Place of residence					
Village	844 (15.1%)	534 (16%)	126 (16%)	184 (13%)	0.017 b
Town	1688 (30.3%)	1012 (30%)	228 (30%)	448 (30%)	
City	3042 (54.6%)	1780 (54%)	420 (54%)	842 (57%)	

Family average monthly income (₺)					
Less than "2000	1176 (21.1%)	753 (23%)	163 (21%)	260 (17%)	0.000a
"2001-3000	1551 (27.8%)	965 (29%)	225 (29%)	361 (25%)	
"3001-4000	924 (16.6%)	556 (17%)	142 (18%)	226 (15%)	
"4001-5000	739 (13.3%)	420 (12%)	114 (15%)	205 (14%)	
"5001-6000	455 (8.2%)	250 (7%)	55 (7%)	150 (10%)	
More than "6001	729 (13.1%)	382 (12%)	75 (10%)	272 (19%)	
Average monthly spending (₺)					
Less than "500	3001 (53.8%)	1831 (55%)	472 (61%)	698 (47%)	0.000a
"501-750	1105 (19.8%)	722 (22%)	126 (16%)	257 (17%)	
"751-1000	537 (9.6%)	318 (10%)	71 (9%)	148 (10%)	
"1001-1250	256 (4.6%)	160 (4%)	23 (3%)	73(5%)	
"1251-1500	189 (3.4%)	295 (9%)	82 (11%)	298 (20%)	
More than "1501	486 (8.7%)	-	-	-	
Father's job					
Official	751 (13.5%)	440 (13%)	108 (14%)	203 (14%)	0.000a
Employee	1130 (20.3%)	681 (21%)	162 (21%)	287 (19%)	
Artisan	577 (10.4%)	354 (11%)	76 (10%)	147 (10%)	
Free work	1271 (22.8%)	830 (25%)	175 (23%)	266 (18%)	
Farmer	471 (8.4%)	289 (8%)	65 (8%)	117 (8%)	
Retired	1374 (24.7%)	732 (22%)	188 (24%)	454 (31%)	
Computer ownership					
Yes	4129 (74.1%)	2367 (71%)	592 (77%)	1170 (79%)	0.000a
No	1445 (25.9%)	959 (29%)	182 (23%)	304 (21%)	
Your level of computer use					
Basic	1412 (25.3%)	943 (28%)	202 (26%)	267 (18%)	0.000a
Middle	3130 (56.2%)	1881 (57%)	448 (58%)	801 (54%)	
Further	1032 (18.5%)	502 (15%)	124 (16%)	406 (28%)	
Do you feel inclined to distance education?					
Yes	1857 (33.3%)	310 (9%)	298 (38%)	1249 (85%)	0.000a
No	3717 (66.7%)	3016 (91%)	476 (62%)	225 (15%)	

Note: ap < .01; bp < .05; The values in parentheses are the percentages. Statistics were calculated by reducing the five-point Likert scale to three.

Next, we determined whether the ordinal logistic andordinal probit regression models satisfy the assumption of parallel regression (parallel lines model). Parallelism hypothesis parameters were determined in such a way that the statistical values for all categories of the dependent variable would pass over a straight line. The Brant test shows that the assumptions of the parallel regression are violated. The result of the assumption of parallel assumption using the Brant test is given in Table 2.

This hypothesis was tested by the Chi-square test. According to the test results, a parallel regression assumption could not be provided ($p < 0.05$).

Table 2.
Parallelism hypothesis testing.

Model	χ^2	sd	p
H_0 hypothesis	237.51		
Brant	346.90	20	0,000

H_0 = Averages for distributions go through the same line.
H_1 = Averages for distributions are passed through the heading.

Table 3.
The results of ordered logistic and probit regression models and marginal effects.

Variables	Ordered Logistic Regression				Ordered Probit Regression			
		dy/dx				dy/dx		
	β	Not Satisfied	Somewhat Satisfied	Satisfied	β	Not Satisfied	Somewhat Satisfied	Satisfied
Gender Status (reference category: male)								
Female	-0.074	0.018	0.003	-0.014	-0.051	0.019	-0.003	-0.016
	(0.06)	(0.014)	(0.003)	(0.011)	(0.036)	(0.014)	(0.002)	(0.011)
Age (reference category: 17-18)								
19-20	0.216c	-0.052c	0.011c	0.041c	0.128c	-0.049c	0.008c	0.041c
	(0.112)	(0.027)	(0.005)	(0.021)	(0.068)	(0.026)	(0.004)	(0.021)
21-22	0.491a	-0.118a	0.024a	0.093a	0.297a	-0.114a	0.019a	0.092a
	(0.127)	(0.030)	(0.006)	(0.024)	(0.076)	(0.029)	(0.005)	(0.024)
23+	1.249a	-0.301a	0.059a	0.237a	0.762a	-0.294a	0.050a	0.244a
	(0.134)	(0.032)	(0.007)	(0.025)	(0.081)	(0.031)	(0.005)	(0.026)
Education year (reference category: 3)								
1st Class	0.117	-0.028	0.005	0.022	0.062	-0.024	0.004	0.020
	(0.097)	(0.023)	(0.004)	(0.018)	(0.058)	(0.022)	(0.003)	(0.018)
2st Class	0.127	-0.031	0.006	0.024	0.076	-0.029	0.005	0.024
	(0.094)	(0.022)	(0.004)	(0.017)	(0.056)	(0.022)	(0.003)	(0.018)
4+	0.194b	-0.046b	0.010b	0.036b	0.114b	-0.044b	0.007b	0.036b
	(0.087)	(0.021)	(0.004)	(0.016)	(0.052)	(0.020)	(0.003)	(0.017)
Marital Status (reference category: married)								
Single	0.703a	-0.169a	0.035a	0.133a	0.428a	-0.165a	0.028a	0.137a
	(0.119)	(0.028)	(0.006)	(0.022)	(0.072)	(0.027)	(0.004)	(0.023)
Place of Residence (reference category: village)								
Town	0.092	-0.022	0.004	0.017	0.056	-0.021	0.003	0.018
	(0.062)	(0.015)	(0.003)	(0.011)	(0.038)	(0.014)	(0.002)	(0.012)
City	0.092	-0.022	0.004	0.017	0.053	-0.021	0.004	0.016
	(0.085)	(0.020)	(0.004)	(0.016)	(0.051)	(0.019)	(0.003)	(0.016)
Place at The University (reference category: other)								
State dormitory	-0.425a	0.102a	-0.021a	-0.081a	-0.252a	0.097a	-0.016a	-0.081a
	(0.079)	(0.018)	(0.004)	(0.014)	(0.046)	(0.018)	(0.003)	(0.015)
Private Dormitory	-0.143	0.034	-0.005	-0.0	-0.084	0.032	-0.005	-0.027
	(0.126)	(0.030)	(0.006)	(0.023)	(0.075)	(0.029)	(0.005)	(0.024)
Home	-0.409a	0.098a	-0.021a	-0.07a	-0.252a	0.097a	-0.016a	-0.081a
	(0.089)	(0.021)	(0.004)	(0.016)	(0.054)	(0.021)	(0.003)	(0.017)
Your level of computer use (reference category: advanced level)								
Basic Level	-0.536a	0.128a	-0.028a	-0.100a	-0.327a	0.126a	-0.022a	-0.104a
	(0.091)	(0.021)	(0.005)	(0.017)	(0.055)	(0.021)	(0.003)	(0.017)
Intermediate Level	-0.356a	0.085a	-0.018a	-0.066a	-0.214a	0.082a	-0.014a	-0.068a
	(0.074)	(0.017)	(0.004)	(0.013)	(0.045)	(0.017)	(0.003)	(0.014)

Father's Education (reference category: university/master)								
Literate/Primary School	-0.230b	0.014b	-0.011b	-0.043b	-0.137b	0.053b	-0.009b	-0.044b
	(0.092)	(0.006)	(0.004)	(0.017)	(0.056)	(0.021)	(0.003)	(0.018)
Elementary School	-0.210b	0.055b	-0.010b	-0.039b	-0.127b	0.049b	-0.008b	-0.040b
	(0.097)	(0.022)	(0.004)	(0.018)	(0.058)	(0.022)	(0.003)	(0.018)
High School	-0.169c	0.040c	-0.008c	-0.032b	-0.102b	0.039b	-0.006b	-0.033b
	(0.087)	(0.210)	(0.004)	(0.016)	(0.053)	(0.021)	(0.003)	(0.017)
Mother's Education (reference category: university/master)								
Literate	-0.294b	0.071b	-0.014b	-0.055b	-0.175b	0.067b	-0.011	-0.056
	(0.134)	(0.032)	(0.006)	(0.025)	(0.081)	(0.031)	(0.005)	(0.026)
University Location (reference category: Black Sea Region)								
East Anatolia region	-0.189	0.045	-0.009	-0.035	-0.125c	0.048c	-0.008c	-0.040c
	(0.120)	(0.029)	(0.006)	(0.022)	(0.073)	(0.028)	(0.004)	(0.023)
Central Anatolia region	-0.402a	0.096a	-0.021a	-0.076a	-0.242a	0.093a	-0.015	-0.077a
	(0.116)	(0.027)	(0.006)	(0.221)	(0.070)	(0.0279	(0.004)	(0.0229
The Mediterranean region	-0.138	0.033	-0.013	-0.026	-0.082	0.032	-0.005	-0.026
	(0.112)	(0.027)	(0.005)	(0.021)	(0.068)	(0.026)	(0.004)	(0.022)
Aegean region	-0.289b	0.069b	-0.014b	-0.054b	-0.166b	0.064b	-0.109b	-0.053b
	(0.118)	(0.028)	(0.006)	(0.022)	(0.071)	(0.027)	(0.004)	(0.022)
Marmara region	-0.258b	0.062b	-0.013b	-0.048b	-0.156b	0.060b	-0.010b	-0.050
	(0.108)	(0.025)	(0.005)	(0.020)	(0.065)	(0.025)	(0.004)	(0.021)
Southeastern Anatolia region	-0.381a	0.091a	-0.019a	-0.072a	-0.236a	0.091a	-0.015b	-0.075a
	(0.130)	(0.031)	(0.006)	(0.024)	(0.078)	(0.030)	(0.005)	(0.025)
Department of the University (reference category: fine art/sports)								
Social	0.144	-0.034	0.007	0.027	0.089	-0.034	0.005	0.028
	(0.122)	(0.029)	(0.006)	(0.023)	(0.074)	(0.028)	(0.004)	(0.023)
Science	0.116	-0.028	0.005	0.022	0.080	-0.031	0.005	0.026
	(0.131)	(0.031)	(0.006)	(0.024)	(0.079)	(0.031)	(0.005)	(0.025)
Health	0.085	-0.021	0.004	0.016	0.059	-0.022	0.003	0.019
	(0.134)	(0.032)	(0.006)	(0.025)	(0.081)	(0.031)	(0.005)	(0.026)
Education	0.229c	-0.055c	0.011c	0.043c	0.143c	-0.055c	0.009c	0.046c
	(0.126)	(0.030)	(0.006)	(0.023)	(0.076)	(0.029)	(0.005)	(0.024)
Cut 1	0.503 (0.214)				0.369 (0.119)			
Cut 2	1.185 (0.215)				0.785 (0.120)			

Note: [a]p < .01; [b]p < .05; [c]p < .10; The values in parentheses are the standard errors.

The results of the estimated ordered logistic and ordered probit regression models and the marginal effects are shown in Table 3. In this model, we used the dependent variable category "attending with distance education" as the reference category. When determining the reference categories for the independent variables, variables with low frequency were taken as reference (Maddala, 1983; Çelik, 2013). Because low-frequency categories cause data skewness and influence the results. To avoid this situation, low-frequency categories have been designated as the reference category.

Because parallel regression assumption could not be provided, we estimated a generalized ordered logistic regression and a generalized ordered probit regression. The results of these models and the marginal effects are shown in Table 4.

According to the generalized ordered logistic regression model given in Table 4, the probability of a student female being not satisfied with distance education was 1.9% higher than that of the reference group. The probability of students aged 19-20 being not satisfied with distance education was 5.4% less than that of the reference group. In other words, as the age of the student increased, the probability of disagreeing with the statement of being satisfied with distance education decreased by 5.6%. The probability of students being not satisfied with distance education in the 21-22, and 23+ age groups decreased at rates of 11.4%, and 28.7%, respectively. In other words, satisfaction rates increased as the age increased. On the other hand, students' satisfaction regarding distance education moderate satisfaction resulted in a decrease of 3.2% in the probability for students in the same age groups as compared to the reference group.

Freshmen student's probability of being satisfied with distance education was 4.2% decreased that of the reference group. Comparably, the probability of moderate satisfaction was 4% higher compared to the reference group. Similarly, students who were at their fourth year or more had a decreased probability of being satisfied with distance education compared to the reference group by 4.6%. In terms of marital status, single students have decreased probability of not being satisfied with distance education compared to the reference group by 13.3%. On the other hand, students who were moderately satisfied with distance education had a decrease in their satisfaction levels in comparison with the reference group by 4.4%. Students' villages, districts and life in the city variables had no correlation with distance education.

Students who lived at the university or home had an increased probability of not being satisfied with distance education compared to the reference group by 9.8% and 8.6%, respectively. Students with a basic level of computer use are 11.3% and 7.8% more dissatisfied than the reference group, respectively. In addition, moderate computer users were 7.4% more likely to be dissatisfied than the reference group.

Table 4.
The results generalized of ordered logistic and generalized probit regression models and marginal effects.

	Generalized Ordered Logistic Regression				Generalized Ordered Probit Regression				
	not satisfied		somewhat satisfied		not satisfied		somewhat satisfied		VIF
Variables	β	dy/dx	β	dy/dx	β	dy/dx	β	dy/dx	
Gender Status (reference category: male)									
Female	-0.034	0.008	-0.149b	0.019b	-0.022	0.008	-0.092	0.021	1.11
	(0.062)	(0.014)	(0.067)	(0.010)	(0.038)	(0.014)	(0.041)	(0.010)	
Age (reference category: 17-18)									
19-20	0.225b	-0.054b	0.233	0.011	0.134b	-0.051b	0.128	0.011	3.66
	(0.115)	(0.027)	(0.144)	(0.022)	(0.069)	(0.027)	(0.080)	(0.022)	
21-22	0.478a	-0.114a	0.609a	0.001	0.286a	-0.110a	0.340a	0.002	4.51
	(0.130)	(0.031)	(0.158)	(0.024)	(0.079)	(0.030)	(0.089)	(0.024)	
23+	1.198a	-0.287a	1.372a	0.032c	0.737a	-0.284a	0.806a	0.027c	3.66
	(0.139)	(0.033)	(0.164)	(0.026)	(0.085)	(0.032)	(0.093)	(0.025)	
Education year (reference category: 3)									
1st Class	0.175c	-0.042b	0.106	0.040b	0.104c	0.040c	0.001	0.039b	2.76
	(0.100)	(0.024)	(0.111)	(0.015)	(0.061)	(0.023)	(0.065)	(0.017)	
2st Class	0.148	-0.035	0.098	0.017	0.091	-0.035	0.061	0.016	1.92
	(0.097)	(0.023)	(0.108)	(0.016)	(0.059)	(0.023)	(0.063)	(0.016)	
4+	0.190b	-0.045b	0.174c	0.013	0.115b	0.044b	0.103c	0.012	2.00
	(0.906)	(0.021)	(0.097)	(0.014)	(0.055)	(0.021)	(0.058)	(0.014)	
Marital Status (reference category: married)									
Single	0.555a	-0.133a	0.792a	-0.044a	0.344a	-0.132	0.495a	-0.024	1.15
	(0.126)	(0.030)	(0.124)	(0.024)	(0.076)	(0.029)	(0.076)	(0.017)	

Place of Residence (reference category: village)									
Town	0.076	-0.018	0.106	-0.001	0.047	-0.002	0.064	-0.002	1.11
	(0.064)	(0.015)	(0.071)	(0.101)	(0.039)	(0.010)	(0.041)	(0.010)	
City	0.113	-0.027	0.036	0.020	0.068	0.019	0.022	0.019	1.20
	(0.087)	(0.021)	(0.099)	(0.015)	(0.200)	(0.014)	(0.057)	(0.014)	
Place at The University (reference category: other)									
State dormitory	-0.410a	0.098a	-0.433a	-0.017	-0.247a	0.095a	-0.249a	-0.016	1.19
	(0.081)	(0.019)	(0.091)	(0.013)	(0.048)	(0.018)	(0.052)	(0.013)	
Private Dormitory	-0.151	0.036	-0.104	-0.016	-0.092	0.035	-0.064	-0.015	1.06
	(0.129)	(0.031)	(0.142)	(0.021)	(0.079)	(0.031)	(0.084)	(0.021)	
Home	-0.362a	0.086a	-0.468a	-0.001	-0.224a	0.086a	-0.256a	0.003	1.15
	(0.092)	(0.022)	(0.101)	(0.015)	(0.056)	(0.022)	(0.059)	(0.015)	
Your level of computer use (reference category: advanced level)									
Basic Level	-0.472a	0.113a	-0.654a	0.078a	-0.285a	0.013a	-0.388a	0.013	2.15
	(0.094)	(0.022)	(0.078)	(0.080)	(0.057)	(0.014)	(0.061)	(0.014)	
Intermediate Level	-0.311a	0.074a	-0.423	0.043a	-0.188a	0.003a	-0.282a	0.003	1.93
	(0.077)	(0.018)	(0.059)	(0.079)	(0.047)	(0.011)	(0.060)	(0.108)	
Father's Education Level (reference category: university/master)									
Literate/Primary School	-0.216b	0.051b	-0.245b	-0.006	-0.129b	0.050b	-0.142b	-0.004	2.77
	(0.095)	(0.023)	(0.104)	(0.015)	(0.059)	(0.022)	(0.062)	(0.015)	
Elementary School	-0.182c	0.043c	-0.257b	0.004	-0.115	0.042c	-0.149b	0.005	2.06
	(0.100)	(0.024)	(0.110)	(0.016)	(0.061)	(0.023)	(0.065)	(0.016)	
High School	-0.171c	0.041c	-0.148c	-0.013	-0.106c	0.041c	-0.091	-0.011	2.03
	(0.090)	(0.021)	(0.098)	(0.014)	(0.055)	(0.021)	(0.058)	(0.014)	
Mother's Education Level (reference category: university/master)									
Literate	-0.288b	0.069b	-0.309b	-0.011	-0.176b	0.068b	-0.181b	-0.010	2.88
	(0.138)	(0.033)	(0.151)	(0.023)	(0.085)	(0.004)	(0.091)	(0.022)	
University Location (reference category: Black Sea Region)									
East Anatolia Region	-0.168	0.040	-0.238c	0.003	-0.111	0.043	-0.150c	0.004	
	(0.125)	(0.030)	(0.139)	(0.021)	(0.077)	(0.029)	(0.082)	(0.021)	2.63
Central Anatolia Region	-0.390a	0.093a	-0.416a	-0.016	-0.239a	0.092a	-0.242a	-0.015	
	(0.120)	(0.028)	(0.133)	(0.020)	(0.074)	(0.028)	(0.078)	(0.020)	2.29
The Mediterranean region	-0.133	0.031	-0.159	-0.002	-0.081	0.031	-0.089	-0.002	2.43
	(0.117)	(0.028)	(0.128)	(0.019)	(0.072)	(0.027)	(0.076)	(0.019)	
Aegean Region	-0.295b	0.070b	-0.284b	-0.017	-0.175b	0.067b	-0.158b	-0.017	2.18
	(0.122)	(0.029)	(0.134)	(0.021)	(0.075)	(0.029)	(0.079)	(0.020)	
Marmara Region	-0.235b	0.056b	-0.308b	0.001	-0.144b	0.055b	-0.174b	0.001	2.71
	(0.112)	(0.026)	(0.123)	(0.019)	(0.069)	(0.026)	(0.073)	(0.019)	
Southeastern Anatolia Region	-0.341a	0.082a	-0.457a	0.003	-0.211a	0.081a	-0.270a	0.004	2.05
	(0.135)	(0.032)	(0.152)	(0.024)	(0.082)	(0.031)	(0.089)	(0.023)	

Department of The University (reference category: fine art/sports)									
Social	0.063	-0.015	0.290b	-0.015	0.035	-0.013	0.164b	-0.038c	4.59
	(0.127)	(0.030)	(0.142)	(0.030)	(0.078)	(0.030)	(0.083)	(0.022)	
Science	0.005	-0.001	0.321b	-0.001	0.003	-0.001	0.188b	-0.058b	3.32
	(0.136)	(0.032)	(0.151)	(0.032)	(0.083)	(0.032)	(0.088)	(0.023)	
Health	0.018	-0.004	0.167	-0.004	0.016	-0.006	0.107	-0.028	3.67
	(0.139)	(0.033)	(0.158)	(0.033)	(0.085)	(0.032)	(0.092)	(0.025)	
Education	0.133	-0.032	0.410	-0.032	0.080	-0.030	0.237a	-0.044b	4.02
	(0.131)	(0.031)	(0.146)a	(0.031)	(0.081)	(0.031)	(0.086)	(0.023)	
Constant	-1.009 (0.204)		-0.673 (0.229)		-0.620 (0.124)		-0.410 (0.133)		

Note:. [a]p < .01; [b]p < .05; [c]p < .10; The values in parentheses are the standard errors. Statistics were calculated by reducing the five-point Likert scale to three.

Students whose father's education level was literate/primary school, elementary school, high school graduate had an increased probability of not being satisfied with distance education compared to the reference group by 5.1%, 4.3%, and 4.1%, respectively. Students whose mother's education level were literate were 6.9% more likely to be dissatisfied with distance education than the reference.

Moreover, differences were found in the satisfaction levels of distance education between the students from different regions. According to the generalized ordered logistic regression model given in Table 4, the probability of a student Central Anatolia Region being satisfied with distance education was 9.3% higher than that of the reference group. The probability of students being not satisfied with distance education in the Aegean Region, Marmara Region, Southeastern Anatolia Region group increased at rates of 7%, 5.6%, and 8.2%, respectively. According to the generalized probit regression model, students from different departments of the university were 3.8% less likely to be dissatisfied with distance education than the reference group. Similarly, the probability of a student is not satisfied with distance education in the science and education department groups decreased at rates of 5.8% and 4.4% respectively.

Additionally, the comparison criteria of the models used in the study are given in Table 5. The models of ordered logistic regression and ordered probit regression could not fulfill the parallel regression assumption. Consequently, we noted that the generalized ordered regression model was the best model because it had the smallest AIC and BIC values, and a more favorable pseudo *R2* value.

Discussion and Conclusion

The present study investigated the distance education satisfaction statuses of university students. A questionnaire was applied to students at state universities in Türkiye. A questionnaire was prepared in line with the studies carried out to determine the views of distance education students in Turkish universities and was applied to university students.

Teaching and learning by correspondence is the basis of distance education. In recent years, many studies on distance education have been conducted regarding student's online learning experiences. However, there has been limited research on the perceptions of the students about distance education in Türkiye. Discovering the students' thoughts on the subject can contribute to the gap in the literature.

The results of the present study showed that approximately 26% of the students were not satisfied with distance education. Moreover, we found that 60% of the students who participated in the study did not approve of distance education.

Table 5.
Comparison of ordered regression models.

Criteria	OLOGIT	OPROBIT	GOLOGIT	GOPROBIT
Pseudo R2	0.0542	0.0541	0.078	0.073
Cox-Snell/ML	0.096	0.093	0.134	0.134
AIC	9892.05	9892.28	9694.59	9695.71
BIC	10037.82	10038.05	9972.88	9981.23
p-value	0.000	0.000	0.000	0.000
N	5574	5574	5574	5574

Note. OLOGIT: Ordered Logistic, OPROBIT: Ordered Probit, GOLOGIT: Generalized Ordered Logistic, GOPROBIT: Generalized Ordered Probit.

As we investigated the sociodemographic factors that might influence students' satisfaction regarding distance education, as per the aim of the study, we discovered that age was one of these factors for all groups. The probability of satisfaction regarding was higher for all dissatisfied and moderate groups than that for reference groups (17-18). The ordinal logistic regression analysis showed that students between the ages of 19-20 are approximately 4% more satisfied with distance education compared to students between the ages of 17-18, students between the ages of 21-22 are approximately 9% more satisfied compared to students between the ages of 17-18, and the students older than 23 years old are approximately 24% more satisfied than students in the 17-18 age range.

Hence, we conclude that the probability of being satisfied with distance education increased with age. Previous studies also reported similar results (Li, 2019; Pal & Vanijja, 2020; Bergdahi & Nouri, 2021; Möhring et al. 2021).

In terms of the education year, students who are in the fourth class or more have a tendency to be satisfied with distance education by about 4% compared to the students in the third year. Therefore, a unit increase in the independent variable indicates an increased probability of transitioning from dissatisfied to moderately satisfied and satisfied. Neroni (2019) found similar results in their study. In addition, the regression analysis was used to explain satisfaction variables of students groups in the literature (Gopal et al., 2021).

The study demonstrated that the variable of education is a significant factor in marital status category. The probability of single students being dissatisfied with distance education was 13% less than that of married students. Other studies have also come to similar conclusions (Sinha & Bagarukayo, 2019; Kumar, 1999). The present study also indicated that there is an inverse relationship between level of computer use and distance education satisfaction. Previous studies' results also support our findings (Radford, 2011; Baber, 2020; AlGerafi & Zhang, 2021). In addition, Upadhayaya et al. (2021) concluded that that age and gender competency of distance learners affect their attitudes towards distance learning.

In our study, a statistically significant negative relationship was found between satisfaction and regions. Notably, the study indicated that there is an inverse relationship between some university locations' and distance education satisfaction. Other studies have also reached similar conclusions (Seaman et al., 2018; Chen et al., 2021; Li et al., 2021). That is, the more diverse or unfavorable the region in which a university is located, the lower the level of student satisfaction tends to be. The influence of regional factors may suggest that socioeconomic, cultural or environmental factors in the region where the university is located may negatively affect student satisfaction. For example, regional factors such as low income levels, inadequate infrastructure, security issues or limited social opportunities may reduce student satisfaction.
Future research should be based on previous research summarized by practices, and students should be encouraged by the success of new premises in this regard. Unfortunately, many distance education programs are launched without such a systematic cost analysis as suggested by authors in the literature (Bernard et al., 2004; Romiszowski, 2004). This analysis is an important step to ensure the sustainability of programs, to ensure the correct allocation of resources and to secure long-term success. It is inevitable to continue distance education in higher education, in case that the pandemic process continues for a long time. The results obtained in the study are expected to make a possible contribution to the distance education processes to be realized. In addition, the results of this study can be used to provide a better understanding to those working in the field of distance education, managers or decision makers, and to guide the planning and implementation of future distance education processes.

This study emphasizes that especially university students with high socioeconomic and educational level and computer users should be targeted with regional differences. Distance education programs should be organized in line with the ideas and thoughts of the students regarding distance education, because mere faculty support is insufficient to run a successful program in distance education. It is also important that the students also feel ready to receive distance education. In addition, our findings support the findings of researchers (Fredericksen et al., 1999; Johnston, 2005; Tüzün & Toraman, 2021) who argue that distance education reduces student satisfaction compared to traditional face-to-face teaching methods. In addition, when the sub-dimensions of the questionnaire used in the study were analyzed, it was found that some aspects of distance education such as technical aspects, advantages and independent learning style had a positive effect on satisfaction levels, while the disadvantages (loss of motivation, inadequacy of resources such as internet and computers, lack of assessment and evaluation, technical problems, etc.) of distance education caused more dissatisfaction. In terms of distance education satisfaction, which was examined under the sub-dimensions, it was found that 59,7% of the students stated that they were not satisfied, 13,9% were undecided and 26,4% were satisfied. In addition, it has been discovered that students experienced difficulties in three dimensions in the distance education process: technical, educational, and social.

Our research has shown that the technical dimension, advantages, materials, demographic factors and independent learning style of distance education affect satisfaction positively, while the disadvantages of distance education cause dissatisfaction. The technical dimension, advantages dimension, disadvantages dimension of distance education, explain about 60% of the change in dissatisfaction of students regarding distance education.

Practically speaking, distance education offers many students a variety of new learning opportunities. Distance education gives the student control over the educational institution beyond access. In the future, each university will focus more and specialize in the range of subjects to offer. The quality of distance education will continue to increase in line with new developments. In order for the distance education process to be successful, it is recommended that institutions, educators, students, and families evaluate the technical, educational, and social dimensions of distance education as a whole.

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