

## Online Learning Satisfaction in Higher Education Amidst the Covid-19 Pandemic

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**Abstract:** Regarding the COVID 19 pandemic, the process should be analyzed very well in order to realize effective online education practices possessing high level communication and interaction in higher education. In this respect in this study, initially it is aimed to determine the satisfaction levels of higher education students towards online education during the pandemic process that affects the whole world and then to reveal the changes of these levels according to the variables such as gender, discipline, education level and grade level. A quantitative cross-sectional design was used in the study. The sample of the study consists of 13447 university students studying online in different faculties of Istanbul University-Cerrahpasa in the fall semester of 2020-2021. According to the results, the students' satisfaction with online education was at a moderate level. In addition, it was observed that students preferred Zoom from the synchronous platforms the most and Canvas from the asynchronous platforms in the online education process. On the other hand, satisfaction levels of female students differ significantly from male students, Science and Engineering and Social Sciences students were more satisfied with the process than the Medicine and Health Sciences students. 6th grade students' satisfaction with the process was higher than other grade levels, and graduate students' satisfaction differed significantly from undergraduate and associate degree students. Finally, the significant differences for all variables were at a low effect level. In the research, various suggestions were made for educators and future studies in order to create more effective online learning environments.

**Keywords:** satisfaction, emergency remote teaching, online higher education, Coronavirus Pandemic, Covid-19.

### Highlights

What is already known about this topic:

- An emergency remote teaching model, where F2F courses are carried online, has been adopted in higher education.
- The students' adoption of online education and their satisfaction are important for an effective online education process.

What this paper contributes:

- The online education process was evaluated from the students' perspective in higher education.
- The students' satisfaction with online education is at a moderate level.
- The tools and platforms that students use in the online education process are revealed.
- The students' satisfaction with online education was examined according to gender, discipline, education level and class level.

Implications for theory, practice and/or policy:

- Various strategies should be developed to enable students to adopt online learning.
- HyFlex course model should be preferred for an effective and efficient learning process in higher education.
- Professional development training can be organized for faculty members for the use of materials and methods that will increase communication and interaction.



## Introduction

The Covid-19 pandemic, which has affected the whole world, still continues. Curfew restrictions have been imposed, and it decisions have been made to close down all schools from pre-school to higher education and switch from face-to-face (F2F) education to distance education. In higher education, an emergency remote teaching (ERT) model, where F2F courses are carried online, has been adopted all over the world (Hodges et al., 2020). Since the courses during the pandemic process cannot be designed and developed in accordance with online learning principles, this online education experience is considered to be an emergency remote teaching, not as an effective online education (Bozkurt & Sharma, 2020; Hodges et al., 2020; Vlachopoulos, 2011). Moving their F2F courses to online environments urgently has been a stressful process for educators and students who have not previously had any educational experience in these environments (Sahu, 2020; Turan & Gurol, 2020). During this transition period, the importance of effective online learning has been understood by administrators, educators and students (Ribeiro, 2020). Although the importance of online learning has inevitably emerged in this process, educators and students have encountered various difficulties in the process. Hence, ERT experiences are diverse. Stewart (2021) compiled the results of the studies carried out during the pandemic period in which he detailed the positive and negative experiences that emerged in this process.

Effective online education requires planning, designing and development processes (Bao, 2020; Hodges et al., 2020). However, universities have offered synchronous and asynchronous learning environments for the use of teachers and students, in line with their technological infrastructure, without a sufficient pre-preparation process in this urgent transition period. Faculty members have used video conferencing tools such as Zoom, Google Meet, BigBlueButton, MS Teams for live lessons and Learning Management Systems (LMS) for sharing their course materials (Durak et al., 2020). Each country has implemented various ERT strategies to ensure that education is not interrupted during the pandemic. For example, in Turkey, medical and health sciences disciplines that are based heavily on practice have transitioned to blended learning; furthermore, online education practices are still continuing in all universities. Despite the fact that it is uncertain how long the pandemic period will continue, it has become a necessity for higher education institutions to embark on a digital transformation. Yet, digital transformation has been on the agenda of universities for the past few years. In the context of higher education institutions, digital transformation can be considered as the sum of all digital processes required to create opportunities to best apply digital technologies (Adedoyin & Soykan, 2020; Kopp et al., 2019). This transformation requires the integration of a sustainable management in institutions in order to adapt to change as a result of new technologies and pandemic process (Abad-Segura et al., 2020). This process also includes adequate strategic preparation, building trust, thinking in processes, consolidating and strengthening the collaborative and organizational knowledge of all parties involved individually (Cameron & Green, 2019). Designing effective online learning activities in higher education is also an important part of digital transformation. The Covid-19 pandemic era has revealed the importance of online learning. The pandemic can also be considered as an opportunity to revise the main goals of education, to eliminate inequality in learning and to develop the vision of education to develop fairer societies (Peters et al., 2020). However, this process undoubtedly brought some difficulties as well as opportunities. For a transformation in line with effective online education practices in higher education, the process should be analyzed quite well. In this context, since students are the group that is most affected by this practice, it is important to reveal their experiences in the process. In this direction, many studies have been conducted in the literature (Table 1).

Table 1. Studies Examining Student Views on Online Education During the Covid 19 Pandemic Process

Authors	Sample	Obtained Results
Aristovnik et al. (2020)	30,383 higher education students	Students were most satisfied with the support of the faculty and public relations departments of universities. Insufficient computer literacy and the excessive workload felt during the pandemic have prevented them from demonstrating their full potential. Students generally feel boredom, anxiety, frustration in the process and are concerned about their future. Recorded videos and providing enough information about the exams are the most important factors affecting the students' satisfaction significantly. Students who are in the first-level in Higher Education, who study in applied sciences, and have certain socio-economic features such as lower living standards, are the ones with the lower satisfaction levels.
Atasoy et al. (2020)	263 university students	Students' satisfaction is generally moderate. The lowest satisfaction with the materials used the highest satisfaction student-instructor interaction. Male's satisfaction was higher, female students significantly preferred F2F learning activities more.
Atilgan et al. (2021)	2611 medical faculty students	Cognitive load in emergency remote teaching experienced by most of the students is high and tiring, there are aspects that are lacking in their education in this process, difficulty in providing self-discipline and this process increases the levels of social isolation. The need to develop solutions for practical training and increase interaction. Problems with assessment and evaluation; exam security, technical problem. Positive experience in assessment and evaluation; making trial before the exam.
Cicha et al. (2021)	670 university students	The most important factors affecting students' emotions and persuading them to adopt distance learning model are enjoyment and self-efficacy.
Dolmaci & Dolmaci (2020)	78 students at foreign languages prep school	Students generally prefer traditional F2F education to synchronous distance education. There are deficiencies in the interaction dimension of synchronous distance education and the dimension of extra activities and homework is important.
Er Turkuresin (2020)	170 Pre-service teachers	Partial satisfaction with distance education. Students' views on distance education do not change according to gender. Students' having internet access and regular follow-up of courses positively affect distance education satisfaction Positive aspects; evaluated as time and space independence, affordability and re-accessing learning resources.
Lee et al. (2021)	190 university students	The course satisfaction of the students decreased during the pandemic period but was at a moderate level. More satisfaction of international students. Challenges for students, such as independent learning, time management, and maintaining motivation.
Salturk & Gungor (2020)	325 university students	The courses were suitable in terms of content and the duration. Distance education does not contribute to their academic development. That distance education is more suitable for theoretical courses. Forums/live classes are not enough for socializing. The instructors successfully managed the process and received feedback on the issues they needed.
Sercemeli & Kurnaz (2020)	254 university students who studied accounting	Students do not adopt the distance education system much. They did not have any problems in terms of self-efficacy regarding the use of the system. Being able to watch video recordings again, flexible training opportunities and saving time are seen as positive aspects. Issues such as the inability to access the Internet and the instructor and feeling socially isolated are seen as negative aspects.
Shin & Hickey (2020)	64 university students	Loss of learning and lack of motivation. Increase in educational and social inequalities during the Covid-19 pandemic. Experiencing problems such as accessibility, digital divide, inequality, and mental/emotional/physical health. The importance of creating and maintaining a sense of community and providing socio-emotional support for solving problems.
Tang et al. (2020)	695 engineering students	General dissatisfaction of students with online learning. Dissatisfaction in terms of communication and question/answer. Integration of online learning with the flipped learning model improves learning, attention, and evaluation.
Turan & Gurol (2020)	544 university students	Students are generally stressful in distance education. Satisfaction with distance education in terms of flexible learning environment and opportunities such as repeating the course. The majority of students prefer to take F2F courses.

The results of the studies in the literature show that students do not adopt online education much, that their satisfaction is moderate, and they prefer F2F education. As seen in Table 1, students have difficulties in issues such as independent learning, time management, maintaining motivation and socializing. On the other hand, the students positively evaluate the flexible learning environment of online education, the independence of time and place, and the ability to watch the lessons again. Some views such as that distance education is more suitable for theoretical courses, that solutions should be developed for practical training and interaction should be increased have prevailed. It was also concluded that students were dissatisfied with the materials used in the distance education process, learning loss occurred and there was lack of motivation. Providing enjoyment and self-efficacy in the distance learning process, affects the students' mood and satisfaction positively. Studies have revealed that dissatisfaction occurs due to the lack of interaction in the distance education process. In the studies conducted with quantitative methods, it is understood that the sample size is generally in the range of 200-300 students and large sample groups from different areas have not been reached.

In addition to quantitative studies examining the experience and satisfaction of students in the ERT process during the pandemic period, many qualitative and mixed-method studies were also carried out. In these studies, the effects of Covid-19 on learning and students' satisfaction were reported in detail from different perspectives. Among these studies, especially Bozkurt et al.'s (2020) case study with the participation of 31 countries is quite remarkable. In the study, it has been tried to determine the urgent measures that can be taken by emphasizing that the pandemic causes the exacerbation of the digital divide, social inequality and injustice in the society. In this process, attention was drawn to the fact that parents were overloaded with the urgent educational roles they assumed in addition to their daily and professional responsibilities. It has also been stated that this situation causes both parents and children to experience psychological problems such as anxiety and trauma. However, the importance of accessibility in learning activities is emphasized so that education is not interrupted. The study also states that ERT requires the use of alternative assessment and evaluation methods, and that support, supervision, ethics, and confidentiality issues should also be reviewed in order to increase student satisfaction. In another study, Tejedor et al. (2021) examined the views of teachers and students in the ERT process in depth with open-ended questions. In this context, it was noted that despite the lockdowns, there was no increase in the number of tutorials used in the learning process, and the exchanges carried out took a much shorter time than F2F learning. Students, on the other hand, stated that they criticize the use of the same materials used for F2F learning in online learning. Ali (2020) emphasized that besides the suitability of the resources and materials used for online learning, the accessibility of the students and the readiness, confidence, and technology competencies of the instructors play an important role in the realization of effective online learning.

In the literature, Elfirdoussi et al. (2020) also tried to determine the limitations of e-learning platforms. For this purpose, the views of 3037 students and 231 professors enrolled in different stages of higher education programs were examined. In the research, all students and professors stated that online learning is not very different and interesting compared to ordinary learning and that at least 50% of the lessons should be conducted as F2F. When the opinions of the students about the participation of the instructors in the online learning process were taken, it was found that the satisfaction of the students was high in the dimensions such as clarity of instructions, quality of course material and videos, responsiveness to questions and, listening; whereas, they concluded that when the assessment of the work carried out is considered, the student satisfaction levels are below the average. They also found out that as in the similar studies in the literature, students especially preferred the use of assessment approaches based on new inquiry-based learning methodologies. When the qualitative studies that are performed in the literature are evaluated in general, it is observed that issues such as the satisfaction with the ease of access to information in the ERT process (Ahmed et al., 2020; Altwaijry et al., 2021; Peñarrubia-Lozano et al., 2021); personal, technical and financial problems in accessing technology (Abuhammad, 2020; Ahmed et al., 2020; Altwaijry et al., 2021; Gillis & Krull, 2020; Peñarrubia-Lozano et al., 2021; Sari & Nayir, 2020); cognitive and psychological overload of teachers and students as well as the experienced anxiety and stress (Abuhammad, 2020; Gillis & Krull, 2020; MacIntyre et al., 2020; Sundarasan et al., 2020); the necessity of using a hybrid method and alternative assessment tools that include the combination of e-learning and traditional teaching methods in order to achieve effective learning (Ahmed et al., 2020; Alqurshi, 2020; Altwaijry et al., 2021; Peñarrubia-Lozano et al., 2021) appear to have been examined.

The Covid-19 pandemic process has brought opportunities and difficulties in the field of education as aforementioned. This process, that is still unclear how long it will take, should be well structured based on the experiences. Since faculty members and students from different disciplines experience online education environments for the first time, it is important to examine this process in detail with the views of the stakeholders. It has been acknowledged that studies examining ERT in higher education during the pandemic period are mostly carried out with qualitative approaches (Stewart, 2021). Data which is collected from large samples with a quantitative approach is important for the generalizability of the results. In addition, different countries examine the effects of the pandemic process on university students in their own contexts. In the context of Turkey, collecting data from diverse subject matter

contexts and multiple subject areas and conducting the analysis are considered important in terms of revealing similarities and differences. As a matter of fact, the experiences and opinions of the stakeholders will shed light on making the education process more effective and efficient. In particular, it is important to focus on the views of students who are in the center of the ERT practice; as they are the most affected group by this process. It is crucial to obtain detailed examinations from different angles by reaching large samples as well. Accordingly, this study aimed to determine the satisfaction levels of higher education students towards online education according to the variables of gender, discipline, education level and grade level. The research questions of the study are determined as follows:

1. What are the tools and platforms that students use in the online education process?
2. What is the students' satisfaction with online education?
  - a. Does students' satisfaction with online education show significant differences according to gender, discipline, education level and grade level?

## **Methodology**

### **Method**

In this study, a quantitative cross-sectional design, was used. This method is used to determine the views of large sample groups about current attitudes or practices (Creswell, 2012; McMillan & Schumacher, 2014). Within the scope of the study, after obtaining the necessary ethics committee permissions, data was collected from the higher education students enrolling in one of the big universities in Turkey via an online questionnaire. Detailed information about the research was presented to the students and it was emphasized that their personal data would be thoroughly protected by adding a participant consent form to the beginning of the questionnaire. Students were then able to participate to the study by approving the consent form.

### **Sample**

The sample of the study consists of university students studying online in different faculties of Istanbul University-Cerrahpasa in Turkey in the fall semester of 2020-2021. 13447 students participated in the study voluntarily. Courses in universities in Turkey are distributed according to grade levels. After completing the compulsory courses at each grade level, students can move to the next higher-grade level. Different approaches have been adopted according to different disciplines and grade levels in ERT applications during the pandemic process. For example, Medical and Health Sciences (Faculties of Medicine, Veterinary, Nursing and Health Sciences) have adopted hybrid education, other disciplines have performed education completely online. For instance, Faculty of Medicine 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> grade levels, Faculty of Veterinary 4<sup>th</sup> and 5<sup>th</sup> grade levels, and Faculty of Nursing 4<sup>th</sup> grade level were held completely F2F; other grade levels were held online. In this process, online education platforms were used.

Before the pandemic, the Google Workspace was provided free of charge for the use of faculty and students at the university where the research was conducted. Along with the pandemic process, the university has also introduced the Canvas system. However, faculty members were not obliged to use a common platform in this process. On the other hand, faculty members used the platform of their choice (Zoom, Google Meet, Microsoft Teams, etc.) while conducting their live lessons. Therefore, students had the chance to experience different online education platforms in the courses of different faculty members. Detailed demographic characteristics of the students in the study are presented in Table 2.

Table 2. Demographic Characteristics of Students

Characteristics	N	%
<b>Gender</b>		
Male	7406	44.9
Female	6041	55.1
<b>Discipline</b>		
Science and Engineering	6075	45.2
Medical and Health Sciences	4045	30.1
Social Sciences	3327	24.7
<b>Educational Level</b>		
Bachelor's degree	3156	23.5
Undergraduate	9685	72.0
Graduate	606	4.5
<b>Grade Level</b>		
Prep	40	.3
1. Grade	4501	33.5
2. Grade	3898	29.0
3. Grade	2307	17.2
4. Grade	2339	17.4
5. Grade	267	2.0
6. Grade	95	.7

### Data Collection Tool

A questionnaire was prepared by the researchers in the study in order to reveal the students' views and experiences about the online education process. Questions to obtain demographic data were included in the first part of the questionnaire. In the second part, there were multiple choices in order to reveal the online education platforms used by students in the online education process and their experiences of using these platforms. In the third part of the questionnaire, a scale consisting of 7 items in the 5-Likert type (1: Strongly Disagree... 5: Strongly Agree) is used to determine their satisfaction. This scale is based on the online education satisfaction scales in the literature (Kucuk & Richardson, 2019; Kuo et al., 2013). For the purpose of content and face validity, three field experts and two language experts checked the whole questionnaire, and the necessary revisions were made. The reliability of the scale was calculated as Cronbach's Alpha reliability coefficient .922. The lowest score that can be given to the items in the scale is 7, the highest score is 35, and the evaluation ranges were determined, and evaluation criteria were created at three levels. The score range of 7.00-16.33 is considered as low, 16.34-25.67 medium, and 25.68-35.00 high satisfaction level.

### Data Analysis

The data were transferred to the IBM SPSS 26 software and analyzed with descriptive and inferential statistical methods. The online education platforms used by the students and their opinions about online education are presented in the form of frequency and percentage values. As the assumption of the difference tests, the normal distribution fit was examined according to the Kolmogorov Smirnov test skewness and kurtosis values. Since normality assumptions could not be provided in line with the obtained data non-parametric tests were used. The satisfaction levels of the students according to gender were analyzed with the Mann-Whitney U test, according to the discipline, class level and education level the data were analyzed with the Kruskal Wallis test. Dunn-Bonferroni test was used to determine the source of significant differences. In addition, the effect sizes of the tests were also calculated. As the difference was found to be significant, the effect size ( $r$ ) U in the Mann Whitney U test was calculated by dividing the U value by the square root of the total number of participants in both groups (Fritz et al., 2012), and by  $\eta^2$  in the Kruskal Wallis H test. According to Cohen (2013), for  $r$  value 0.50 indicates high effect, 0.30 medium effect and 0.10 small effect. Green & Salkind (2016) expressed .01 as small, .06 as medium and 0.14 as high effect value for  $\eta^2$ . These criteria were used to interpret effect sizes in this study.

## Findings

### Tools and platforms used in the online education process

The tools and platforms students prefer in the online education process were examined. The findings obtained are presented in Table 3 and Table 4:

Table 3. Results regarding the tools used by students in the online education process

Tools	Frequency	Percentage
Smartphone	9417	70.0
Laptop Computer	8884	66.1
Desktop Computer	2600	19.3
Tablet	1335	9.9

When Table 3 is examined, it is seen that students mostly use smartphones ( $f = 9417$ ; 70.0%) and laptop computers ( $f = 8884$ ; 66.1%) in online education environments.

Table 4. Results regarding the platforms students used in the online education process

	Platforms	Frequency	Percentage
Synchronous	Zoom	10344	76.1
	Google Meet	6364	47.3
	BigBlueButton	2424	18.0
	MS Teams	1418	10.5
Asynchronous	Canvas	8985	66.8
	Google Classroom	5516	41.0
	Other	1722	12.8

When Table 4 is examined, it is seen that students mostly use the Zoom from synchronous platforms ( $f = 10344$ ; 76.1%) in the online education process. Furthermore, it is understood that Canvas, which is one of the asynchronous platforms, is used the most.

### Satisfaction with online education

Descriptive statistics regarding students' satisfaction with online education are presented in Table 5. It is inferred that the average score of students' satisfactions with online education is  $\bar{M} = 22.35$  and their level of satisfaction is medium. The average and standard deviation values of each item are also presented in Table 6.

Table 5. Descriptive statistics on online education satisfaction

	N	Minimum	Maximum	M	SD	Satisfaction Level
Satisfaction Score	13447	7	35	22.35	7.28	Medium

Table 6. Average and standard deviation values of the items

Items	M	SD
In general, I am happy to take lessons with distance education.	3.06	1.308
The lessons contribute to my academic development.	3.42	1.167
The lessons contribute to my professional development.	3.37	1.196
I am satisfied with the level of interaction that takes place in the lessons.	3.30	1.154
I am pleased to take the lessons this semester completely online.	3.09	1.362
I find the assessment and evaluation activities carried out in distance education sufficient.	3.25	1.186
I think that practical lessons in distance education can be done at a sufficient level.	2.85	1.312

Within the scope of the research, the satisfaction scores of the students towards online education were also examined according to their gender. The Mann-Whitney U test was used to examine the satisfaction scores of the students according to their gender. The findings obtained are presented in Table 7:

Table 7. Mann-Whitney U Test results of satisfaction scores for online education by gender

Gender	N	Mean Rank	Sum Rank	U	p	Effect Size
Female	6041	6912.89	41760759.50	21228747.50	.000*	0.044
Male	7406	6569.93	48656868.50			

\*( $p < .05$ )

It is seen that the satisfaction scores of the students towards online education differ significantly according to their gender ( $U = 21228747,50$ ;  $p < .05$ ). Considering their average rank, it is understood that female students' satisfaction with online education is higher than that of males. Considering the effect size, it is observed that the difference between the two groups is quite low.

Students' satisfaction scores for online education were analyzed according to the disciplines they studied. The Kruskal Wallis H test was used to analyze the satisfaction scores of the students. The findings obtained are presented in Table 8:

Table 8. Kruskal Wallis H Test results of satisfaction scores for online education according to discipline

Discipline	N	Mean Rank	df	$\chi^2$	p	Significant Difference	Effect Size
Medicine & Health Sciences	4045	6449.77	2	31.084	.000	Science-Medicine Social-Medicine	.002
Science & Engineering	6075	6885.10					
Social Sciences	3327	6763.25					

\*( $p < .05$ )

It is found that satisfaction scores of students towards online education differ significantly according to the disciplines they study ( $X^2 = 31.084$ ;  $p < .05$ ), the effect size is low. Considering the average rank, it is presumed that students studying in science and engineering are relatively more satisfied with online education.

Students' satisfaction scores for online education were analyzed according to their grade levels. The Kruskal Wallis H test was used to examine students' satisfaction scores according to their grade levels. The findings obtained are presented in Table 9.

Table 9. Kruskal Wallis H Test results for online education satisfaction scores according to grade levels

Grade Level	N	Mean Rank	df	$\chi^2$	p	Significant Difference	Effect Size
Prep	40	9024.29	6	170.634	.000*	P-1; P-2; P-3; P-4 1-2; 1-3; 2-3 - 4-3 5-1; 5-2; 5-3; 5-4 6-1; 6-2; 6-3; 6-4	.013
1. Grade	4501	6897.74					
2. Grade	3898	6673.16					
3. Grade	2307	6183.91					
4. Grade	2339	6654.55					
5. Grade	267	8551.39					
6. Grade	95	9299.45					

\*( $p < .05$ )

When Table 9 is examined, it is spotted that students' satisfaction scores for online education differ significantly according to their grade levels ( $X^2 = 170.634$ ;  $p < .05$ ). Considering their average rank, it is understood that 6<sup>th</sup> grade level students have the highest satisfaction with online education. The average satisfaction score of Prep, 5<sup>th</sup> and 6<sup>th</sup> grade students is 1-2-3. It has been observed that the 1<sup>st</sup> and 4<sup>th</sup> grades differ significantly from the 2<sup>nd</sup> and 3<sup>rd</sup> grades, the 2<sup>nd</sup> grade from the 3<sup>rd</sup> grade and the 4<sup>th</sup> grade from the 3<sup>rd</sup> grade. When the effect size of the test is examined, it is understood that this difference is small.

Students' satisfaction scores for online education were also compared according to their education level. The Kruskal Wallis H test was used to examine the satisfaction scores of the students according to their education level. The findings obtained are presented in Table 10.



Table 10. Kruskal Wallis H Test results for online education satisfaction scores according to education levels

Education Level	N	Mean Rank	df	$\chi^2$	p	Significant Difference	Effect Size
Bachelor's Degree	3158	7346.99	2	233.204	.000*	Bachelor's degree -Undergraduate	.016
Undergraduate	9685	6425.38				-	
Graduate	606	8252.08				Graduate-Bachelor's degree Graduate- Undergraduate	

\* ( $p \leq .05$ )

It is determined that the satisfaction scores of the students towards online education differ significantly according to their education level ( $\chi^2 = 233.204$ ;  $p < .05$ ) whereas the effect size is low. Considering the average rank, it is seen that the satisfaction scores of postgraduate students for online education are the highest and significantly different from the others, while the satisfaction scores of the associate degree students differ significantly from the undergraduate students.

## Discussions

The results of the study marked the fact that students mostly use Zoom from the synchronous platforms in the online education process, followed by Google Meet and BigBlueButton. In higher education, teachers have taught their courses through these environments (Johnson et al., 2012; Xie et al., 2020). As a matter of fact, during the pandemic process, Zoom has become one of the most preferred synchronous communication environments as a result of its advanced video conferencing features (Nah & Siau, 2020; Tenebruso, 2020; Xie et al., 2020). In the research, it was revealed that Canvas was used the most among asynchronous platforms, followed by Google Classroom. As a learning management system, Canvas is one of the most preferred LMSs in higher education all over the world (Fathema & Akanda, 2020; Xie et al., 2020). At the university where the research was conducted, Google Classroom had actively been being used as an LMS before the pandemic. Canvas LMS system was also set up at the university within the pandemic period. Therefore, both platforms were actively used in this process, thus communication and interaction with the students continued uninterrupted. Students connected to these platforms mainly with their smartphones and laptops. It is understood that students do not experience limitations in access to technology.

The study determined that students' satisfaction with online education was moderate. In general, the online education process has its advantages and disadvantages. As a matter of fact, in the pandemic period, the digital divide has increased social inequality and injustice and negatively affected the education process at all levels. This process has had psychological effects such as anxiety, trauma, boredom, and frustration on parents, teachers and students (Aristovnik et al., 2020). Therefore, these psychological effects also affected the online learning process (Abuhammad, 2020; Gillis & Krull, 2020; MacIntyre et al., 2020; Sundarasan et al., 2020). The problems with access to technology are among the factors that prevent students from accessing education (Abuhammad, 2020; Ahmed et al., 2020; Altwaijry et al., 2021; Gillis & Krull, 2020; Peñarrubia-Lozano et al., 2021; Sari & Nayir, 2020). In addition, more responsibilities and increased workload on students in the online education process cause dissatisfaction (Elfirdoussi et al., 2020). Studies in the literature report inability to access the internet and thus education, feeling socially isolated (Sercemeli & Kurnaz, 2020; Shin & Hickey, 2020), insufficiency of forums and live lectures for socialization (Salturk & Gungor, 2020), insufficiency in communication and interaction (Dolmaci & Dolmaci, 2020; Tang et al., 2020), difficulties in independent learning, time management and sustaining motivation (Lee et al., 2021; Shin & Hickey, 2020) as negative aspects of online education in this process.

On the other hand, there are some advantages offered by online learning. The literature suggests that flexible educational environment, time and space independence and opportunities to repeat lessons asynchronously by re-accessing learning resources (Ahmed et al., 2020; Altwaijry et al., 2021; Aristovnik et al., 2020; Er Turkuresin, 2020; Peñarrubia-Lozano et al., 2021; Sercemeli & Kurnaz, 2020; Turan & Gurol, 2020) were evaluated positively by the students. Moreover, the adoption of flipped learning, quality of course materials and videos, and the adoption of alternative assessment approaches based

on new inquiry-based learning methodologies have positive effects on students' learning processes and satisfaction (Elfirdoussi et al., 2020; Tang et al., 2020). In this process, considering the advantages and disadvantages of online learning, it can be inferred that students' satisfaction remains moderate. Although students think that online education contributes to their academic and professional development in this process, it has also been revealed that they are generally not very satisfied with taking the courses online and that they think that courses requiring practice cannot be realized at a sufficient level.

Female students' satisfaction with online education is significantly higher than that of males. However, the effect size is small. In previous studies, the obtained results suggest that the students' views on online education did not change by gender (Er Turkuresin, 2020), and that male students' satisfaction was higher (Atasoy et al., 2020). Furthermore, this study determined that the satisfaction scores of the students towards online education differed significantly according to the disciplines they studied, but the effect size was small. Students studying in science and engineering are relatively more satisfied with online education. In contrast, Tang et al. (2020) stated that engineering students are generally not satisfied with online learning. It has been revealed that the satisfaction of students in Medicine and Health Sciences is lower than other disciplines. Students studying in the applied sciences department have lower satisfaction with online learning (Aristovnik et al., 2020). Regarding the medical faculties, Atilgan et al. (2021) stated that there are problems especially in practical education courses, students have high cognitive load, and they have difficulties in providing self-discipline. However, despite all the limitations, the fact that the satisfaction of the students in all disciplines is at a moderate level may indicate that this process is generally well managed in terms of technical and pedagogy at the university.

This research identified that the satisfaction scores of the students towards online education differed significantly according to their grade levels. While the literature suggests that the first-year students have lower online learning satisfaction (Aristovnik et al., 2020), in this study, first-year students' satisfaction was higher than 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year students. This situation can be associated with the fact that the courses in the 1<sup>st</sup> year in Turkey are more theoretical and less in number. 6<sup>th</sup> grade level students have the highest satisfaction with online education. This is followed by preparatory and 5<sup>th</sup> grade level students. The relatively lower level of satisfaction of the 3<sup>rd</sup> grade level students can be explained by the increase in the number and difficulty levels of the courses in higher education programs in Turkey and the transition from theory to practice. Students in the 5<sup>th</sup> and 6<sup>th</sup> grade levels are studying in the discipline of medicine and health sciences and experienced online education in the first months of the pandemic. Then the training process continued as a hybrid. In the literature, the necessity of using a hybrid method and alternative assessment tools that include the combination of e-learning and traditional teaching methods in order to realize effective learning is blatantly seen (Ahmed et al., 2020; Alqurshi, 2020; Altwaijry et al., 2021; Peñarrubia-Lozano et al., 2021). As a matter of fact, continuing the process as a hybrid positively affects learning, attention and satisfaction (Tang et al., 2020). The relatively high level of satisfaction at the preparation level can be attributed to the fact that the courses at this level are oriented towards foreign language teaching and that the online education process is supported by various interactive materials and methods. In foreign language education, extra activities and assignments are important in the synchronous online education process (Dolmaci & Dolmaci, 2020). It can be interpreted that the preparatory program of foreign languages of the university is well structured in this direction.

Satisfaction scores of students towards online education differ significantly according to their education level, and the graduate students' satisfaction is the highest. While undergraduate students have difficulties such as independent learning, time management and maintaining motivation in the online education process (Lee et al., 2021), the advanced skills of graduate students may have enabled them to adapt to the online education process more quickly.

## Conclusion and Suggestions

As a result, in the study, the online education process at higher education level during the pandemic period was evaluated comprehensively from the students' perspective. Within the scope of the study, the fact that data was collected from a large sample group studying in different disciplines and grade levels is the strength of the study and has increased the generalizability of the results. However, the fact that data was collected from a single public university of Turkey is a limitation of the study. As the practices during the pandemic period differ in each country and even in universities, the results of students' online learning satisfaction are thus also limited to the country context. According to the results of the study although there is a difference in student satisfaction according to gender, discipline, grade and education levels, it has been revealed that students cannot fully adopt online education and their satisfaction is moderate. It is important to use synchronous and asynchronous platforms effectively in ensuring the adaptation of students to online education. In this context, it may be beneficial that the instructors design interactive digital materials in online education to increase communication and interaction between students and instructors. Nonetheless, it can be suggested that faculty members include activities that will support students' social presence in online education in order to ensure students' online learning satisfaction.

It is important for institutes to create various strategic plans in transforming online learning into a more effective and efficient one. For example there are problems in conducting practical courses online. Alternative online solutions should be considered, especially for applied areas. Virtual laboratories, simulations and other applications could be developed for the acquisition of psychomotor skills specific to the fields. Professional development training can be organized for faculty members for the use of materials and methods that will increase communication and interaction in the online learning process, and for the formative assessment and evaluation activities. An increase in the satisfaction of the students could be achieved by carrying out the online exam process in a more transparent and auditable way through applying the current features of the LMS and the safe exam browser settings This new normal in higher education that adopting a hybrid approach by integrating the strengths of online education and F2F education will enable a more effective and efficient learning process.

By creating hybrid learning environments in future studies, students' learning performances and satisfaction can be examined as well. Factors affecting students' satisfaction can be investigated in depth and from different perspectives based on sociological, psychological and field specific features. In addition, considering that the pandemic period lasts longer than expected, the change in students' satisfaction during the process can be examined.

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