An Investigation of Students' Preferences, Satisfaction and Performance in Online Assessment Amidst the COVID-19 Pandemic in Türkiye

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ABSTRACT

This study aimed to discuss the online/e- assessment methods applied in the education faculties of state universities during the Covid-19 pandemic and to reveal student satisfaction and achievement in such methods. Accordingly, the relationships between student grades, the preferred method, and student satisfaction levels were examined by residential region and gender. The study was conducted on 371 university students from seven universities in different geographical regions of Turkey. A survey design, one of the quantitative research methods, was preferred in the study. The analysis results showed that the most preferred online assessment methods by the academics during the Covid-19 pandemic included homework (93%), timed online examinations (92%), and online presentation (76%). When students' attitudes towards those assessment methods were examined, we found that students' favorite online assessment method was homework (71%), and timed online examinations (46%) and online presentations (31%) were the least preferred methods. Besides, the students received the highest grades (76 and above) by doing online homework (72%), online presentations (69%), and projects (62%). They received the lowest scores in online examinations (50%). The findings revealed a positive and significant relationship between students' satisfaction with online assessment methods and their grades, but there was no significant difference between student satisfaction and gender variable. The university's region was also an influential factor in determining student satisfaction. In conclusion, both faculty members/academics and students predominantly preferred the homework method, and the students received the highest grades with this method. Although the most preferred assessment method in face-to-face and online education is testing, most academics did not prefer e-tests, mainly stemming from their lack of experience in administering online tests and managing the potential problems of online assessment methods.

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INTRODUCTION

The distance education process, which began with letters and continued with radio and television broadcasts, has recently been realized through the internet and various technologies (Sırakaya and Çakmak, 2014). Thanks to the increase in internet connection speed and easy access to the internet, web-based education systems that provide the opportunity to learn anytime and anywhere have become prevalent (Başol et al., 2013). Today, distance education can be acknowledged as a model that can be synchronous or asynchronous and offers the opportunity for students and instructors to be in different places (Sakal and

Güvenç, 2016). It is generally characterized by two-way communication with visual, audio, and interactive synchronous modalities. Before the Covid 19 pandemic, web-based distance education platforms were considered an alternative to support face-to-face education and provide equal opportunities to spread educational standards. However, it has become the primary education system today. Distance education can be used in any formal education setting and professional development courses. In this study, we focused on defining the preferences, satisfaction and performance of university students, who had to experience distance education due to the Covid-19 pandemic, towards online assessment methods.

The measurement and evaluation dimension of web-based distance education involves online assessment methods. In other words, online assessment is a part of distance education. The sudden outbreak of the Covid-19 pandemic has minimized the optimal potential of distance education technologies, and the available online measurement and evaluation procedures had to be adapted according to the knowledge, skills, and assets of both academics and students, and the technological infrastructure of university (Kolcu et al., 2020). During the Covid-19 pandemic, universities in some countries suspended the letter grade system and preferred the "pass-fail" or "successful-unsuccessful" system (Sarı, 2020).

E-assessment systems support different examination types such as true-false, multiple-choice, fill-in-the-blank questions, match-up and combination items, and numerical and oral exams. Even projects, presentations, or assignments can be considered examinations in e-assessment systems. Such examination types can be designed synchronously (all students take an exam at the same time interval) or asynchronously (students take an exam at different times) (Yenilmez et al., 2005; Başol et al., 2013). The full automation of e-assessment facilitates the time-consuming routines of holding and evaluating an examination, thus providing examinants with the time to solve exam-related problems and improve education quality. It also saves time for academics for their academic endeavors (Yenilmez et al., 2005).

The advantages of online exams can be listed as follows: low-cost and time-efficient, easy storage of exam documents, instant feedback, flexibility, fewer human errors, less subjectivity, more transparency, instant grading, and absence of space limitations (Sırakaya et al., 2015; Saban et al., 2010). Additionally, students report that they feel more comfortable, fast, productive, and secure in online exams than traditional exams (Saban et al., 2010). There are also particular limitations and disadvantages of online testing, such as the requirement of a computer and internet access, safety issues surrounding online exam cheating, and some communication problems (Arslan & Yetgin, 2020; Anderson et al., 2005, as cited in Sırakaya et al., 2015).

The e-assessment system has been an alternative method even before the Covid 19 pandemic, and there is vast quantitative and qualitative literature dealing with different dimensions of online testing. For example, in a content analysis study by Arslan and Yetgin (2020), who reviewed the studies on the online assessment between 1987 and 2018, it was found that there were many papers on students' attitudes and opinions towards online examinations and online exam systems (Yenilmez et al., 2005, Yağcı et al., 2015), online assessment and evaluation (Callı et al., 2003; Battal et al., 2010; Nguyen et al., 2017), reliability of online exams (Gül & Doğan, 2011; Sakal & Güvenç, 2016; Keskin & Güneş, 2015), and testing modality and its effects (Alexander et al., 2001; Clariana and Wallace 2002; Oduntan et al., 2015).

There is a numerous number of studies on students' attitudes and perceptions of online testing/examination in the literature, and the majority has been conducted in the last 20 years. For example, a dissertation by Şanlı (2003) was one of Türkiye's pioneer studies on this topic. It discussed university students' attitudes towards online exams through scales and interviews and revealed that the students found the online exams effective and positive due to certain advantages, including immediate feedback, random item order, item analysis, and immediate scoring. Similarly, Pino-Silva (2008) conducted a survey on university students to determine the advantages and disadvantages of computer-based examinations and underlined students' positive perceptions of online exams mainly due to instant access to exam questions and answers. Recent studies also have addressed the online assessment methods considering several variables and revealed students' positive attitudes towards e-assessment. For example, the attitudes of 661 associate degree students (288 female and 367 male students) from different programs towards online exams were examined (Sırakaya, Sırakaya, & Çakmak, 2015), and it was concluded that the students' attitudes were above the midpoint, and the attitude scores differed according to gender, internet use time and skills.

Accordingly, both attitude and value scores of male students were higher than female students. However, in the anxiety sub-scale, male students had higher scores than female students. Additionally, the attitude scores of internet users for more than five years were higher in online exams than those experienced on the internet for 1-3 years (Sırakaya, Sırakaya, & Çakmak, 2015). Sorensen (2013) also examined chemical engineering students' attitudes towards online exams using an online questionnaire and showed students' positive attitudes and desire to see in other departments. The results also showed that successful students were more in favor of the e-examination than less successful students. In a study by Da'asin (2016), it was observed that university students had positive attitudes towards online exams, but they also experienced high levels of anxiety and stress during the online exams. Lastly, in their experimental study on the academic performance and attitudes of 163 vocational high school students who received online education, Ilgaz and Adanır (2019) stated that students had positive attitudes towards online exams and found them efficient practical, and reliable.

Especially during the Covid 19 pandemic, the number of studies student opinions and attitudes towards online exams was pretty limited. In their study on university students, Ocak and Karakuş (2021) found that students mostly had technical problems such as internet disconnection, so they had negative attitudes towards online exams. Arslan (2022) also investigated university students' attitudes and opinions about online assessment methods during the Covid-19 pandemic and concluded that the students were partially positive about e-assessment but also worried about possible technical problems. The study results indicated that students' attitudes differed significantly by age and gender. Binnahedh (2022), Ayyoub & Jabali (2021), Rajeh et al. (2022), Ahmet et al. (2021), and Aljohani et al. (2021) were other researchers dealing with online exams and found that university students generally had positive attitudes towards e-assessment methods including online tests, e-portfolios and blogs.

In light of the relevant literature, the purpose of our study was to determine online assessment methods experienced by education faculty students from different universities during the Covid-19 pandemic and to show their satisfaction level and academic performance in such e-exams. In this context, the following research questions were tried to be answered in this study.

- Which online assessment methods do the students experience during the Covid-19 pandemic?
- What do the students think about the online assessment methods they experienced during the Covid-19 pandemic?
- Does student satisfaction with e-assessment methods differ by gender and region?
- What are students' grade points in the online assessment methods during the Covid-19 pandemic?
- What is the correlation between students' satisfaction level and grade points?

RESEARCH METHOD

Research Model

It was a cross-sectional survey study, one of the quantitative research methods, and the study data were collected in a single time period (Creswell, 2002). Quantitative research methods are the most widely used method, including numerical and verbal data that can be analyzed statistically and descriptively. Survey studies allow researchers to determine important beliefs and attitudes (Creswell, 2002; 376).

Participants

In this study, the participants were determined by the snowball sampling method, which is one of the purposive sampling methods. According to Cohen (2007), the sampling method is a sampling method that expresses the selection of individuals according to certain criteria. Accordingly, we contacted the academics acquainted with the researchers in other universities via e-mail and asked them to apply the e-questionnaire

to their students. Similarly, they were requested to send the e-questionnaire to other universities. Participation was voluntary, and easy access and snowball sampling techniques from non-probability sampling methods were preferred in the study. The study was carried out with 371 education faculty students from different universities in five regions of Türkiye, especially from Dokuz Eylül University (123 students), Harran University (114 students), and Akdeniz University (75 students), which constituted 85% of the sample. The distribution of the sample by five regions is as follows: Aegean Region (36.4%), Eastern Anatolia Region (7%), Black Sea Region (5.7%), Mediterranean Region 20.2%, and South-Eastern Anatolia Region (30.7%).

Data Collection Process and Tools

The study data were collected using an online questionnaire developed by researchers and prepared on Google Forms. Necessary permissions for data collection were obtained by Dokuz Eylul University Institute of Educational Sciences. In the first part of the questionnaire, the participants were thoroughly informed that their identities would be kept confidential, that the data would only be used for research and educational purposes, that participation was voluntary, and that they could withdraw at any point without any excuse. The participant students were allowed to move on to the next section upon their consent to continue. The questionnaire aimed to determine the online assessment experiences of the students and consisted of three parts and 19 questions. In the first part, the students were informed about the purpose of the study, privacy, and confidentiality.

The second part of the questionnaire included the items to collect personal information about the participants, including age, gender, university, and department, which were the independent variables. The participants were also asked whether they had previous experiences in online assessment methods.

The third and last part of the questionnaire involved seven 5-point Likert-type items in determining the online assessment methods the students experienced in the 2020-2021 fall semester and their satisfaction level. The items were rated between "I am very satisfied" and "I am not satisfied at all." There was also the "I have no idea" among the option. Before the questionnaire was applied to the research group, firstly questions were sent to two field experts and some of the questions was removed and changed in line with the opinions of the experts. After revision of the questions, a pilot study was conducted with 20 students to test internal validity and reliability. The Cronbach's Alpha reliability coefficient was 0.81. Besides, an option of "Other methods" was added in case of the availability of different methods apart from the given ones, and students were asked to write this method. Lastly, the participants were asked to write down their grade points in those e-exams. Thus, we aimed to explore the relationship between student preferences for e-assessment methods and their academic success in future studies.

Data Analysis

The study data were analyzed using the IBM SPSS software version 20 and reported using descriptive and interpretive statistics. Descriptive data were shown in tables and graphs with percentage, mean, standard, and frequency values. Pearson correlation coefficient, independent sample t-test, and one-way ANOVA were used for interpretative statistics. The normal distribution of the data, a requirement of the parametric tests, was checked performing Kolmogorov-Smirnov analysis in addition to the standardized Skewness and kurtosis analysis. The results revealed no severe violation in the groups. The significance level was set at $p<0.05$.

FINDINGS

Demographic data of the participants

The demographic information of 371 participants surveyed in the study is shown in detail in the table. Accordingly, 65% were female, and 35% were male students. Of all the participants, approximately 33% attended Dokuz Eylül University, 30% Harran University, 20% Akdeniz University, and 15% other universities.

Table 1. *Demographic Information of the Participants*

Variable		n	Avg±Sd (%)
Age		371	21.55±3.22
Gender	Male	242	(65.2)
	Female	129	(34.8)
University	Dokuz Eylul University	123	(33.2)
	Harran University	114	(30.7)
	Aegean University	12	(3.2)
	Igdir university	6	(1.6)
	Ataturk University	20	(5.4)
	Mediterranean University	75	(20.2)
	Karadeniz Technical University	21	(5.7)

Which online assessment methods do the students experience during the Covid-19 pandemic?

In the questionnaire, the students were asked which assessment methods they experienced, and the answers are summarized in the table below.

Table 2. *Preferred Online Assessment Methods and Percentages During the Covid-19 Pandemic*

Assessment tool/Method	%	n
Homework	93	347
Project	39	146
Timed Online Exam (e.g., 40 minutes)	92	343
Online Open Exam (e.g., one week)	57	215
Online Oral Exam	37	138
Online presentation	76	282
Other	19	71

As understood from Table 2, the most commonly preferred e-assessment method by academics was "homework" (93%), which was followed by "timed online examinations" (92%). It seems that both assessment methods are the most used ones compared to other methods. They were followed by the "online presentation" method (76%). The least preferred methods were "online oral exam" (37%) and "project" (39%). The students were also allowed to write down different online assessment methods they received apart from the given ones. In “Other methods” category (19%), students indicated that they experienced "online reading" (n=2), "lecturing" (34), "class participation" (6), "online discussions" (4), "quiz" (10) and "watching lecture videos" (15) methods.

What do the students think about the online assessment methods they experienced during the Covid-19 pandemic?

Table 3. *Descriptive Statistics of the Students' Satisfaction with E-Assessment Methods*

Assessment tool/Method	n	Min	Max.	x	sd
Homework	347	1	4	2.90	.95
Project	146	0	4	2.25	1.28
Timed Online Exam (e.g., 40 minutes)	343	0	4	2.34	1.05
Online Open Exam (e.g., one week)	215	0	4	2.53	1.30
Online Oral Exam	138	0	4	1.80	1.30
Online presentation	282	0	4	2.48	1.20
Other	71	0	4	1.39	1.50

According to the table, the satisfaction average of the students was the highest in the homework method (x=2.90), which was similarly followed by online open exam (x=2.53) and online presentation (x=2.48)

methods. The lowest averages were found in the project (x=2.25), timed online examination (x=2.34), and other methods (x=1.39). The results showed that the students were least satisfied with the online oral exams (x=1.80). They also stated that they were not satisfied even with the other online assessment methods (x=1.39) either. The students' opinions about the e-assessment methods are summarized in the graphic below.

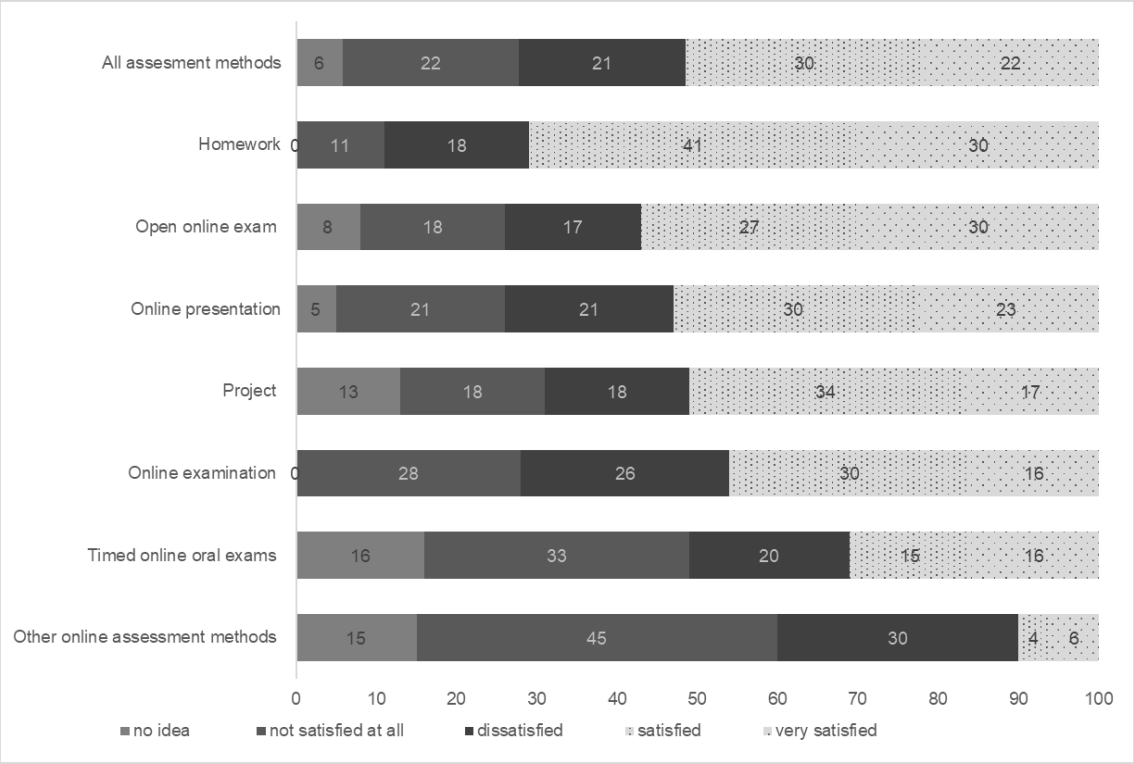

Figure 1. *Students' Satisfaction with E-Assessment Methods*

The participants were generally content with online testing (52%), but 43% were not satisfied with such methods, giving varying answers such as "I am not satisfied at all" or "I am not satisfied." 6% of the students did not express an opinion. In this sense, the most satisfactory e-assessment method was the "homework" (71%) [“I am satisfied” (41%), and “I am very satisfied” (30%)]. The open online exam (57%), online presentation (53%), and the project (51%) were also among the other favorite methods. However, the assessment methods specified in the "Other methods" option were the least favorite methods (75% in total) ["I am not satisfied at all" (45%) and "I am not satisfied" (30%)]. Besides, timed online examinations (54%) and online oral exams (53%) were among the other unfavorite methods.

Does student satisfaction with e-assessment methods differ by gender and region?

An independent sample t-test for gender and one-way ANOVA analyses for region variable, including five groups, were performed to show whether student satisfaction varied by gender and region. The t-test results revealed (Table) no statistically significant difference between male (M=3.45, SD=0.91) and female (M=3.53, SD=0.91) students (t (369) =0.83, p=0.40).

Table 4. *T-test Results by Gender*

Gender	n	x	sd	df	t	p
Female	242	3.53	0.91	369	.83	.40
Male	129	3.45	0.91			

According to the ANOVA results, the “region” variable was influential on students' satisfaction level (F (4.366) =18.46 p=0.000). A complementary posthoc analysis was performed to determine the groups with a statistically significant difference.

Table 5. *ANOVA Results by Region*

Region	n	x	sd	Area	Sum of Squares	df	Mean Square	F	p
Aegean	135	3.83	.78	B. Groups	52.37	4	13.09	18.46	0.00**
Southeast Anatolia	114	3.03	.84	W. Groups	259.54	366	.70		
Eastern Anatolia	26	3.41	.81	Total	311.92	370			
Mediterranean	75	3.45	.91						
Black Sea	21	4.26	.96						

** The mean difference is significant at the 0.00 level.

Whether the group variances were equal was tested using Levene's test, and it was found that the variances were equally distributed across the groups (L=1.33, p=0.25). Then, Scheffe’s multiple comparison technique, which is sensitive to Type I error and frequently preferred in a posthoc analysis, was used in the study.

Table 6. *Post-hoc Scheffe Test Results*

Comparison **Region**	**Region**	**Mean difference**	Scheffer**R**
Aegean	Southeastern Anatolia	0.79	0.00**
Southeast Anatolia	Mediterranean	-0.42	0.02*
Eastern	Black Sea	-1.23	0.00**
Anatolia	Black Sea	-0.85	0.01*
Mediterranean	Black Sea	-0.80	0.00**

*, mean difference is significant at the 0.05 level; **, the mean difference is significant at the 0.00 level.

As seen in the table, the statistical difference was significant at the 0.00 level between the Aegean and Southeastern Anatolia Regions; Southeast Anatolia and the Black Sea Regions, and the Mediterranean and the Black Sea regions. It was significant at the 0.05 level between Aegean and Mediterranean Regions; and Eastern Anatolia and the Black Sea Regions. Accordingly, the students' satisfaction levels studying in the Black Sea region were the highest, and the lowest levels were found in the Southeastern Anatolia region.

What are students’ grade points in the online assessment methods during the Covid-19 pandemic?

The students were asked to note their grade points from the online assessment methods, which were categorized considering data usability and accessibility. Accordingly, the grade points were grouped as follows: 0-25, 26-50, 51-75, 76-90, and 91-100. The findings regarding each online assessment method are as follows:

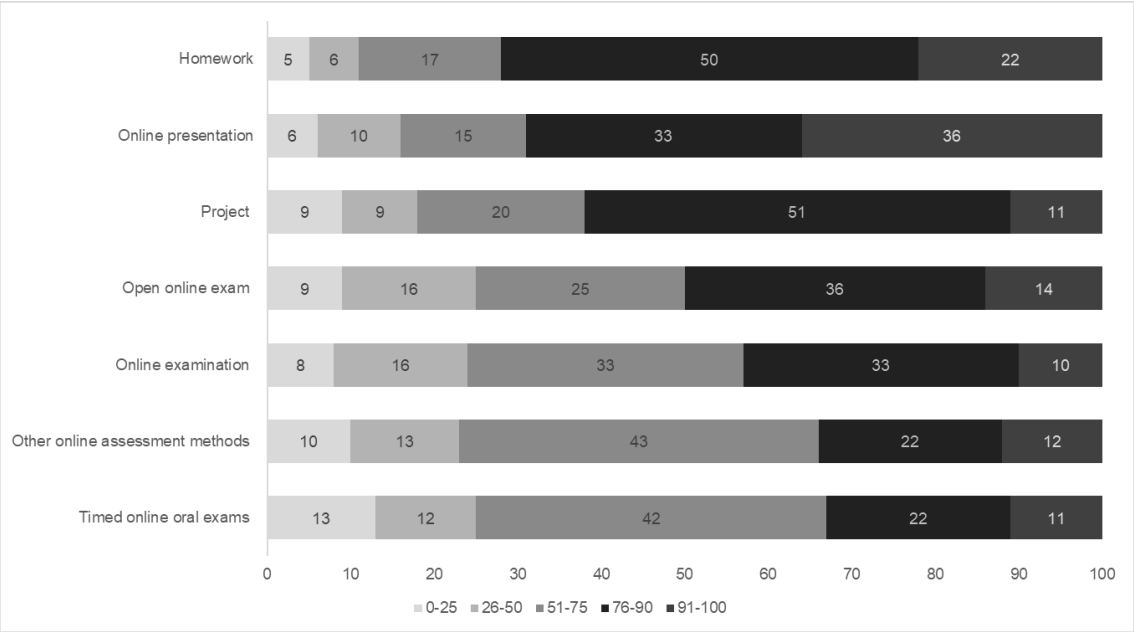

Figure 2. *Students' scores with e-assessment methods*

The figure shows that the students got the highest scores from homework, online presentation, project, and online open exam, respectively, which showed parallelism with their satisfaction level. Of the assessment methods, 50% of the students scored between 76 and 90, 22% scored between 91 and 100, and 72% scored 76 and above. This rate was 69% in the online presentation, 62% in the project, and 50% in the open online exam. The participants received the lowest scores in online oral exams with a grade of 75 or below (67%), “other methods (66%), and timed online examinations (57%).

What is the correlation between students' satisfaction level and grade points?

The correlation between the student satisfaction with online assessment methods and exam scores was analyzed using bivariate correlation, which was based on the Spearman coefficient. The test results are shown in the table below.

Table 7. *Spearman Correlation Between Student Satisfaction and Exam Scores*

Variable	x	Sd	1
1. Satisfaction Level	2.45	.92	-
2. Exam Score	3.50	.92	0.270**

**, correlation is significant at the 0.01 level

Accordingly, there was a positive and significant correlation at the level of 0.27 (27%) between students’ satisfaction with e- assessment method and their exam scores. This showed that students liked the method more when they got high scores in the exam.

DISCUSSION AND CONCLUSION

This study aimed to determine the online assessment methods that university students had to experience due to the Covid-19 pandemic and their opinions/satisfaction levels and grade points in e-assessment. The results regarding the first study question showed that "homework" was the most preferred e-assessment method by academics during the pandemic (93%), followed by "timed online examination" (92%) and "online presentation” (76%). The finding is consistent with the literature. For example, Raje and Stitzel (2020) found that homework and online exams were the most preferred methods during the Covid-19 pandemic. It should be noted that, before the Covid-19 pandemic, the most preferred assessment

methods in formal and distance education were tests and examinations. In this sense, in a study on measurement and evaluation methods in undergraduate education (Karaali et al., 2020), “examination” was the most common method (100%), and it was followed by “homework” (44%) and “presentation” (27%). Similarly, we found that “homework” and “presentation” were the favorite methods, but it was mainly due to the urgent requirements of distance education during the Covid-19 pandemic. In a literature review on online assessment methods used during the Covid-19 pandemic, we found that both students had problems with online testing systems, including technical problems and demanding access to necessary documents and materials in the system, and academics who had a lack of experience in online systems (e.g., Arslan, 2022; Ocak and Karakuş. 2021; Kılınç et al. 2021; Aljohani et al. 2021; Raje and Stitzel 2020;). Thus, it can be said that academics mostly preferred “homework” as a "security blanket.” Besides, the homework method might have been preferred since both students and academics did not have to use the online assessment tools or the internet.

In the study, we asked students' favorite e-assessment method, and the homework method was the most preferred one (71%). However, timed online examinations and oral exams were the least favorite methods (46% and 31%, respectively). There are different findings on university students’ opinions about homework, which is considered an alternative measurement and evaluation method in the literature. For example, some students preferred the traditional assessment methods since such online methods and techniques did not yield objective results (Duban & Küçükyılmaz, 2008), but some had positive attitudes towards online testing as it took individual differences into account, offered a process-oriented assessment opportunity, and prevented memorization (Acun and Kanber, 2007; Duban and Küçükyılmaz, 2008; Güven and Eskitürk (2007). The answers to why online exams are not among students’ favorite e-assessment methods can be sought in previous studies on this subject. In this sense, students expressed several hesitations about online exams, primarily such as insufficient test duration and technical problems (Aybek et al., 2014; Reid et al., 2016; James 2016; Arslan 2022).

The students were asked to write down their grade points, and the results showed that over 72% of students scored 76 and above out of 100 by doing homework. It was seen that the students got the lowest scores from the online oral exams (34%, 76, and above) and timed online examinations (43%, 76, and above), which might explain the reasons why students’ favorite e-assessment method was “homework." Similarly, we found a positive statistically significant correlation between students’ preferences and grade points.

The study also checked whether student satisfaction with e-assessment methods changed according to gender and the region where the universities are located and found no significant difference by gender but by the region. There are both supporting and opposing findings regarding the effect of gender (As there was no study on student satisfaction in the literature, we focused on student attitudes and perceptions). For example, Dermo (2009), Da'siin (2016), and Ilgaz and Adanur (2019) concluded that gender was not a determinant of attitudes towards online assessment methods, which overlapped with our finding. On the contrary, Jamil (2012) and Bahar and Asil (2018) emphasized the determinant role of gender. It was also observed in almost all studies that males had higher attitude averages than females, but we reached the opposite result in our study; that is, female students had higher scores than male students. It might result from the widespread use of technology today, regardless of gender, as Leach and Turner (2015) mentioned. The findings regarding the location/region of the universities suggested high satisfaction scores and significant differences, especially in the Black Sea and Aegean regions. The lowest satisfaction scores were measured in the Southeast and Eastern Anatolia regions. The significant differences across regions might stem from the fact that students' technological proficiency, devices, and equipment directly affected their perspectives on online assessment. In Türkiye, the internet infrastructure, especially in the Eastern and Southeastern regions, is limited (Selim and Balyaner, 2016), and students come from low socio-economic

families (Rençber, 2018), which explains this result. Besides, universities' technological infrastructure and opportunities were another reason for various student attitudes (Bakioğlu et al., 2015). In this context, the differences in online measurement and evaluation tools used in distance education (e.g., usability, speed, user-friendly design, and effectiveness) can also be the reason for attitudinal variety.

This study focused on online assessment methods that university students experienced during the Covid-19 pandemic. The urgent and widespread need for a new education system due to the pandemic has caused various problems for students, academics, and educational institutions that cannot completely adapt to the process. In this sense, determining the most or least preferred online assessment methods and their reasons can shed light on the field experts and practitioners in the future. Both academics and students preferred homework as an optimal assessment method, but it was necessary rather than a choice. It also involved many factors such as the availability and efficiency of universities' technological infrastructure, personal and regional differences in technological opportunities, and the skills of students and academics. If such problems are solved, the attitudes and preferences towards online assessment methods can change, objective and fair assessment methods can emerge, and user-friendly, reliable, and practical online assessment opportunities can be created for both students and academics.

Note: The terms "e-assessment" and "online assessment" were used synonymously in the study, as suggested by Hertel and Konradt (2004)

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