

# Undergraduate students' views of and difficulties in online exams during the COVID-19 pandemic

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## Abstract

The coronavirus pandemic, which affected every aspect of life around the world, has led to radical changes in teaching and learning methods. It is no longer healthy for students being together for a long time in classroom. For this reason, online education applications have started to be implemented rapidly around the world. Not only the education process but also the assessment processes have been moved online. Online exams are in many ways differ from face to face exams. In this context, the aim of this study was to examine undergraduate students' views about online exams. A semi-structured interview form was used as data collection tool. The study group of this research were 55 undergraduate students selected by convenience sampling method and data were analysed using content analysis. Results of the study revealed that students mostly had technical problems such as internet connection and sudden log out. Moreover, they also encountered different problems such as difficulty in being motivated to online exams, lack of time or insufficient feedback.

**Keywords:** Online exams, undergraduate students' views, problems

## Introduction

Internet technology has been used to support educational settings for many years. For example, it moved educational activities out of classroom. Students are provided with access to more materials and gain ability to use internet technologies (White & Hammer, 2000). With transition of lessons from traditional classroom to online, student and teacher interaction, communication, educational paradigms, learning processes and assessment techniques are fundamentally changing (Robles & Braathen, 2002). Educators and educational institutions must adapt to these rapid changes in information technologies (Çelen, Çelik & Seferoglu, 2011).

Resources available in internet are quite rich, applications are unlimited compared to traditional resources. This diversity offers learning opportunities in ways that would not be possible with traditional classroom resources. However, educators aiming to take advantage of extensive resources and usability of internet, face many problems during inclusion of these new resources into their classes. One of these problems is assessment which reflects education, practices, how students are taught and what students learn (Galante, 2002). Although online education technologies are mostly adopted and used, online assessment processes haven't been carried out in targeted way yet. For this reason, educators should also pay attention to assessment of their education in online education process (Robles & Braathen, 2002).

The COVID-19 pandemic has affected the world and caused education to be halted. As the world's all over, pandemic has affected education in Turkey and online education has started. However, transition to online education suddenly and students' not being ready for online assessment system caused some problems. In order to solve problems related to this sudden change, these problems should be determined. In this context, aim of this study is to determine problems experienced by undergraduate students' online exams.

## *Online education*

Keegan (1988) defines online education as a process in which teachers and students participate in educational activities in different places, unlike face-to-face education, individual work is at the forefront, content is followed in computer environment, and students communicate with their teachers and each other through computer technologies. Aparicio, Bacao & Oliveira (2016) adds that online education has three basic elements; people, technologies, and services. In addition to this definition, Gunawardena, Wilson & Nolla (2003) added a cultural aspect of online education. In online education, it is important that this communication and interaction, which is not face-to-face should be appropriate for social culture. For example, as long as student participating in online courses and answering a question is perceived as normal in that culture, there is no problem for adapting online education. On the other hand, basic elements of online education cannot be provided as long as online education is perceived as different, difficult and strange in the society. Moreover, Moreno-Ger, Burgos, Martínez-Ortiz, Sierra & Fernández-Manjón (2008) focused on the pedagogical needs of online education such as internal motivation. Keegan's (1988) definition is the most relevant to the aims of this study. Although other definitions are contributing to clear understanding and deeper interpretation, this study generally focuses on online education and online assessment specifically Keegan's (1988) definition is therefore more relevant to current study.

Online education activities are increasingly used in educational setting, and it is aimed to develop traditional educational methods (White & Hammer, 2000) and to contribute to solutions of some problems encountered in traditional education such as difficulties experienced due to education in very crowded classrooms or inability to listen to lesson again (Karağaçlı, 2002). Moreover, online education both changed basic structure of information exchange and enabled teachers to make changes in teaching techniques (White & Hammer, 2011). Today qualified online education is much more important that it should be at same level as face-to-face education (Dirks, 1998). Online education has benefits such as flexibility, ease of access to education at appropriate time, and learning anytime, anywhere (Robles & Braathen, 2002; Keskin & Guneş, 2015). However, in addition to these facilities, it has some shortcomings also. In online education, since instructor and students are not physically in same environment and face-to-face communication cannot be achieved, assessment is done differently. Unless student is actively participating in something in virtual classroom, teaching becomes difficult. It is important for student to participate in activities such as doing homework, performance task, quizzes or group work. This situation requires use of alternative assessment methods and assessment process needs to be more transparent and support learning since assessment helps determining quality of learning (Arend, 2007). Literature review indicated that researchers focused on different aspects of online education such as instructor and student views on online education applications (Tanyıldızı & Semerci, 2005; Torkul, Kibar & Tasci, 2004; Tufekci, Ekinci & Kose, 2013), factors affecting online education (Aragon & Johnson, 2008), student learning strategies in online courses (Arend, 2007), problems in online education (Çelen, Çelik & Seferoglu, 2011), technology in online education (Hillier & Fluck, 2017) and motivation in online education (Kawachi, 2003). In these studies, the time shortage of instructors, unethical behaviours in online education, lack of information about online education, and deficiencies in technology literacy are generally emphasized. Some other studies focus on online assessment which are presented below.

## *Online assessment*

Online assessment is defined as web based or intranet assessment (Ayo, Akinyemi, Adebisi & Ekong, 2007) and is more difficult than traditional assessment. Students' attendance, doing assignments, participating in courses actively are recorded in technological environment. However, the important thing is to be able to determine what and how much student learned with online education. In online assessment before developing an effective assessment tool, instructor must have a necessary

knowledge of course content and academic competence. Since teaching and presentation method changes, instructors also need to change their methods of determining teaching and learning effectiveness, and assessment activities (Robles & Braathen, 2002).

Web-supported applications in online assessment process offer many conveniences for instructors. For example, student responses can be recorded in a digital file and feedback can be given easily. Student answers can be compared. Statistical calculations of correct and incorrect answers can be figured faster (Dickinson, 1997). Some other advantages of online assessments are; using more visuals, not using too much paper, easy to analyse results, and conducting exams from one centre (Hols-Elders et al., 2008). In online assessments, multiple choice questions, fill-in-the-blanks questions, matching questions, short answer questions, numbering questions, right-wrong questions, etc. can be used. Other assessment methods can be in the form of forum and homework modules, in-class activities, end-of-term assessment questions or final written exams (Kınalıoğlu & Güven, 2011). Literary review of online assessment revealed that while some studies focus on online assessment (Dirks, 1998; Galante, 2002; Shraim, 2019), some others focus on comparison of online assessment and traditional assessment (Luecht, Hadadi, Swanson & Case, 1998; Robles & Braathen, 2002; Ryznar, 2020; Sarrayrih & Ilyas, 2013; Shraim, 2019; Stowell & Bennett, 2010) and security in online exams (Cluskey, Ehlen & Raiborn, 2011; Alessio, Malay, Maurer, Bailer & Rubin, 2017; Colby, 2018).

Online education and online assessment were implemented before COVID-19 pandemic. However, it was conducted in a limited number of lessons and limited hours. With Covid pandemic, online education started to be implemented in all courses and at all grade levels. Depending on quarantine, online education is now carried out everywhere. This situation obliged universities to review their previous infrastructure and facilities and to make necessary changes. Therefore, online education after the COVID-19 outbreak is different.

### *Online assessment in Turkey*

In Turkey, online assessment applications have started to gain momentum in recent years. In particular, the COVID-19 pandemic has made it necessary to accelerate this process and identify problems encountered.

Depending on decision of government, in all levels, face to face education in Turkey was suspended in March 2019. After then online education started. For about 10 months, online education was conducted in universities. During period of March 2020 and June 2020, since universities were not prepared for online education, online courses were asynchronous. Course documents were uploaded to the system. Lessons were supported with homework and problems arose from time to time. In September 2020, many universities switched to synchronous education in order to be more professional and to further reduce technical problems. In Turkey, online assessments are mostly conducted in the form of multiple choice questions. And they were carried out using Adobe Connect and Microsoft Teams systems. However, there were also assessment methods made in the form of homework. While one midterm exam and one final exam are held in traditional exams, online assessment is made as two midterm exams and one final with the decision of universities in online assessment. However, instructor of that course decided the type of exam in general. The rapid transition to online education due to the pandemic caused many problems in online assessment process. In online assessment, similar to face to face exams, some problems can be seen such as insufficient knowledge about assessment processes, instructors' lack of time, insufficient assessment studies in institutions (Çallı, Torkul & Taşbaşı, 2003). In their study Keskin and Güneş (2015) suggested a security system for online assessment. Similarly, Çallı, Torkul & Taşbaşı (2003) suggested online assessment system designs and Bozkurt and Uçar (2018) suggested biometrics for identity verification. In these studies, assessment and security in online exams are emphasized. Literary review also indicated that there are some studies about students' views on online education. Kuo, Walker, Belland

& Schroder (2013) found that learner-instructor interaction, learner-content interaction, and internet self-efficacy were good predictors of student satisfaction while interactions among students and self-regulated learning did not contribute to student satisfaction in online education. In their study Yang & Cornelius (2004) state that delayed feedback from instructors, unavailable technical support from instructors, lack of self-regulation and self-motivation, the sense of isolation, monotonous instructional methods, and poorly-designed course content were negative results of online education. Tello (2007) analysed student persistence in online education and addressed online instructional techniques, faculty development, technology development, and program development. Most research has focused on students' views on online education, but there is still a lack of robust research on undergraduate students' views on online assessment.

With this study, problems experienced in online assessment process can be determined by obtaining student views on online assessment process and measures can be taken to eliminate these problems, so that quality and effect of online education can be increased, universities can develop their policies for online education and create necessary regulations. In addition, reasons for students' behaviour, attitudes, and perspectives towards online course can be better understood in online education.

Determining difficulties undergraduate students experience in assessment will also shed light on difficulties experienced in online education during pandemic periods. For this reason, this study aims to examine undergraduate students' views about online exams and expected to contribute to literature.

The research problems of this study are:

- What are the difficulties experienced by undergraduate students in the preparation process for online exams?
- What are the difficulties that undergraduate students encounter during online exams?
- What are the measures that can be taken to solve the problems encountered in online exams?

## Method

Because the aim was to examine undergraduate students' views for online exams more deeply, research methodology of this study was a case study. In a case study, researcher is primarily focused on understanding a specific individual or situation (Fraenkel, Wallen & Hyun, 2012). In this study, aim is to understand students' views about problems they encountered in online exams, to examine this specific case more deeply with a specific group of participants (in this study undergraduate students), to obtain in-depth data about problems in online education in a real life situation. For this reason, this study is a case study.

## Study group

The study group consists of 55 undergraduate students studying at two different universities (one of them is from the east of Turkey, Sivas Cumhuriyet University and the other one is from the west part, Afyon Kocatepe University). For sampling, convenience sampling method was used. In convenience sampling method, researcher chooses a situation that is close and easy to access. The probability of participants being selected as a study group is unknown (Dawson & Trapp, 2001).

Before study was conducted, participants were given detailed information about process by pre-interviewing. Ethics committee approval and participant approval were obtained for study. In this study, undergraduate students were chosen as a study group. The reason is that in Turkey online exams were held only at universities, not at other grade levels (pre-K12). Since problems experienced in online exams are the focus of study, the fact that participants have taken online exams is main

element of sample selection. Moreover, this study included education faculty undergraduate students. Undergraduate students were selected from different departments, aiming to provide as much diversity as possible in study group. Undergraduate students were from Science (15), Mathematics (13), Social Studies (14) and Primary School (13) preservice teachers. For grade levels, seniors, sophomores and juniors were included, freshmen were not included. Since they had not yet taken face-to-face exam at university and therefore they could not make comparison between face to face exam and online exams they were not included. Students in study group have attended online exams using online exam systems at least twice. This study is limited to opinions of participants.

### *Data collection tool and process*

Data of this study was collected via semi structured interview form developed by researchers. A semi structured interview was conducted during research process. With interviews, the aim was to enable participants to detail their views and to reach more elaborated data. Interview helps researcher achieve more in-depth, complex and difficult information about participants' views (Kumar, 2005). With eight open ended questions included in semi structured interview forms, students were given freedom of expression and opportunity to make comments. Questions in semi-structured interview form were prepared by researchers on the basis of literary review of studies and research problems of this study. Two experts in the field of qualitative research were asked to examine questions and expert views were received. Based on expert opinion, one question depending on the view that it does not fully reflect purpose of research was removed and one question was shortened. Forms and expressions in two questions were changed to be more understandable (Walton, 2010). Pilot study was carried out with two students. Interview form has been finalized according to expert opinions and results of pre-application. The first three questions in semi-structured interview form were prepared in order to determine difficulties students encounter during exam. The fourth, fifth and sixth questions were aimed at determining difficulties they encountered during exam. The last two questions were prepared in order to determine thoughts of undergraduate students on the solution of these problems. The study was conducted in fall semester of 2020-2021 academic year for two weeks according to pre-prepared interview schedule. Interviews were conducted online in order to prevent risks that may occur due to the pandemic. Each interview with undergraduate students lasted an average 15-20 minutes. One of researchers was also an interviewer. Participants were also informed about this. Audio recordings were recorded after getting participant permissions. At the end of each interview, audio recordings were transcribed and made ready for analysis.

Sample questions from semi-structured interview form:

- "What kind of problems do you encounter before online exams?"
- "How do you prepare for online exams?"
- "What are the most common difficulties you encounter during online exams?"
- "What kinds of problems prevent successful application of exam?"
- "What can be done before online exam so that online exams run smoothly?"
- "What precautions should instructors or institutions take before online exams to make exam process more comfortable for students?"

### *Data analysis*

Data collection and data analysis processes were carried out together. The three-stage qualitative analysis method of Miles and Huberman's (1994) was used in data analysis. These stages are: "Data condensation", "Data display" and "Conclusion drawing/verification". Data condensation was collecting data. Data display stage included determining similar sentences by examining raw data.

Then codes themes and categories were formed. In verification stage deductions were structured. In conclusion results were compared to studies in literature. Data were analysed after each interview. The study was carried out by taking codes from textual expressions as a conventional qualitative analysis. Without making assumptions about codes and categories, researchers analysed content of data (Merriam, 2001). Data analysis was mainly carried out to interpret data.

Before data analysis participants were given codes as P1, P2, P3. Researchers first read data many times and formed a general perspective. Then, data was analysed deeply. The focus was on explicit and implicit expressions of participants. Key concepts stated in participants' expressions have been identified. Codes suitable for each key concept were determined and expressions were classified according to these codes. Categories were determined from codes that have common features. Categories were compared, and themes were created considering their similar and different features (Pazargadi, Khatiban & Askorab, 2009; Schwandt, 1997). Codes, categories and themes were discussed continuously. Researchers peer checked results. To illustrate important parts of interviews quotations were given. The aim in content analysis is to reach connections among expressions and basic concepts (Patton, 2014). Themes and categories obtained from data through research questions of study were presented in findings section according to each research question. In coding for instance, it was concluded that the most repeated expressions of the first research problem were "checking", "lack of", "not reaching" and "not knowing" expressions. After these statements were determined as codes, it was determined that all these codes constitute "precaution" theme before online exam. Considering problems experienced by undergraduate students before online exam with codes and categories, it was decided to present these findings in "pre-exam stress" theme.

In this study main purpose of data analysis was to present findings in detail, clearly and succinctly. Content analysis was made through themes and codes obtained. A general conclusion has been reached from codes and themes. Care was taken not to present data directly in a descriptive manner, and quotations were only included to increase credibility. For the reliability of study, views of researchers were compared and similarities and differences were determined. The following formula, proposed by Miles and Huberman (1994), was used to determine agreement between researchers:

"Percentage of compromise = [consensus / Na (consensus) + Nd (disagreement)] x 100".

As a result, compliance percentage of study was calculated as 82%. According to Miles and Huberman (1994) compliance percentage as 70% and above indicates that study is reliable.

## Findings

Findings obtained indicate three main themes; pre-exam stress (three categories), application process (three categories) and suggestions for solving online exam problems (five categories). According to the first research problem of "What are the difficulties experienced by undergraduate students in preparation process for online exams?" Pre-exam Stress theme extracted from interviews and Informing Problems, Problems in Preparing for Exam and Precaution categories were specified.

Table 1 indicates that in Precaution category students control hardware, software and social environment. In Problems in Preparing for Exam category, students have problems with Lack/Insufficiency of Course Documents/Materials, Technological Tools, Affective Features and Time. In Informing Problems Category, students have problems about exam details as duration, variability and scope of exam.

A sample view from checking course document is given below:

P11: *"Here I have advantage of re-watching online lessons and learning topics I don't understand. I follow these and prepare all notes I have taken, if I have missing lecture documents, I complete them and work before exam."*

**Table1. Basic themes, categories and codes regarding the preparation process for online exams**

Theme	Category	Sub Category	Code	Participants	f
Pre-Exam Stress	Precaution	Hardware/ Software	Checking course materials/documents (word/pdf)	P3,P6,P8,P11,P12,P14,P16,P17,P20, P28, P35, P46,P47,P53	14
			Checking whether technological tool to be used is working or not	P3,P7,P11,P12,P14,P16,P32,P47,P55	9
			Checking internet connection	P8,P10,P17,P27,P39	5
			Providing technological tool in advance	P7,P14,P22,P39	4
		Social Control	Creating a silence environment	P12,P26,P34	3
			Warning family members about using Internet unnecessarily	P5,P9	2
		Lack/ Insufficiency of Course Documents/ Materials	Lack of course documentation	P5,P6,P11,P23,P36,P50,P51	7
			Not reaching course notes	P5,P8,P18,P24,P33,P51	6
			Not reaching instructor for resources	P6,P10,P14,P37,P48	5
		Problems in Preparing for Exam	Problems Regarding Technological Tools	Internet problem	P1,P4,P5,P11,P16,P23,P24,P35,P39,P41,P45,P50,P52,P53
	Not knowing how to use computer program for exam			P3,P16,P19, P25,P33,P47,P54	7
	Problems arising from home environment (Power cut-Sound etc.)			P1,P4,P10,P22,P35,P46	6
	Insufficient number of computers			P2,P11,P16,	3
	Affective Features		Not focusing on online exams	P5,P8,P11,P13,P14,P19,P20,P31,P34,P41,P49	11
			Not benefitting from online exams	P7,P12,P17,P18	4
			Inability to study for online exam	P1,P9,P13	3
	Time		Late loading / not uploading of course materials to system by instructor	P9,P22,P31,P49,P54	5
			Downloading course materials over a long time	P8,P17,P21,P55	4
			Access to course materials in a long time due to system	P10,P14	2
	Informing Problems	Informing About Exam	Insufficient information about scope of exam	P6,P11,P28,P21,P29,P30,P51,P27,P31,P36,P40,P45,P49,P52	13
Variability in exam date			P3,P17,P22, P32,P44,P45,P52,P55	8	
Lack of information about exam			P9,P12,P15,P18,P20,P23	6	
Not providing information about the duration of exam			P2,P3,P5,P9	4	
Providing information only about the type of exam			P8,P16,P20	3	

The following samples of student view concern the categories of Problems with the Technological Tools, Lack of course material and Information about the exams:

P35: "I check internet many times. I take care that my phone works."

P 5: "I was in trouble to find enough resources to study for exam. Questions in exams can be either very difficult or very easy. Therefore, I had to work from many sources, but the resources I could reach are not enough."

P45: "Information was given about the date of exams, but when exam week approached, dates exams were changed and moved earlier, and these changes were notified late."

In terms of the second research question, regarding students' difficulties during the online exams, the Application Process theme and the categories of Technical Issues, Structure of Exam and Personal Problems were specified (Table 2).

**Table 2. Basic themes, categories and codes about the application process for online exams**

Theme	Category	Sub Category	Code	Participants	f	
Application Process	Internet Connection Problem	Inability to connect to internet		P2,P7,P11, P13,P15,P19, P21, P20,P42	9	
		Internet outage problem		P5,P7,P12,P20,P29,P32,P35,P42	8	
		Insufficient internet quota		P5, P7, P10, P17	4	
	Technical Issues	System Related Problems	Inability to return to previous exam questions		P5, P7, P8,P11,P14,P15,P18,P22, P23,P25,P30,P33,P34	13
			Not being able to enter exam because of system density		P5,P6,P13,P19,P32,P50	6
			Having difficulty to view questions		P6,P15,P28,P36,P49	5
			Missing questions		P4,P7,P19,P26	4
			Expulsion from system		P4, P11, P12	3
			Incorrect coding of answers (due to system)		P1, P9, P38	3
			Problem of recording answers		P1, P15	2
	Problems With Device	Software deficiencies of exam device		P22,P37	2	
		Hardware deficiencies of exam device		P5	1	
	Structure of Exam	Features of Question	Often having multiple choice questions		P7,P28,P39,P44,P48	5
			Online exam questions being more difficult than classical exams		P10,P31,P49,P52	4
			Questions from same topics		P3,P27,P55	3
Questions not compatible with course content				P6,P14	2	
Duration		Limited time to respond questions		P1,P4,P5,P7,P8,P12,P13,P16,P23, P24,P32,P33,P41,P47,P53,P55	16	
		Inability to view questions in sufficient time		P7,P11,P12	3	

Table 2. (Continued)

Theme	Category	Sub Category	Code	Participants	f
Application Process	Structure of Exam	Duration	Inadequate time due to slow operation of system	P11,P24,P39	3
		Communication	Inability to convey problem experienced in exam to instructor	P6,P9,P16,P23,P24,P45,P54	7
			Lack of face-to-face interaction	P10,P16,P19,P24,P38,P46	6
		Exam Security	More likely to cheat in online exam	P4,P13,P37,P48	4
			Keeping notebooks and books open	P7,P13,P17	3
		Personal Problems	Pedagogical Effectiveness	Concern about whether answers were recorded correctly	P3,P5,P8,P14,P15,P20,P28,P31,P52
	Concentration problem in online exams			P11,P14,P26,P29,P34,P49	6
	Feeling of not fully learning the subject in online classes			P2,P8,P15	3
	Motivation-Anxiety		More excitement in online exams	P6,P9,P10,P15,P22,P27,P34,P36,P43,P44,P47	11
			Feeling demoralized by technical problems during exam	P1,P5,P13,P23,P35,P48,P49,P54	8
			Less attention to online exam	P4,P10,P16,P23,P35,P40	6
			Increasing online exams anxiety	P8,P13,P14,P22	4
			Stress of having an exam in front of camera	P6, P27	2

Table 2 indicates that in Technical Issues category students have problems with Internet connection, system and device. In structure of exam category students reported problems with the features of questions, duration and communication and exam security. In personal problems category students have problems as pedagogical effectiveness and motivation-anxiety.

Students' views about the sub categories of Internet Connection Problem and System Related Problems is the following:

P 7: "I take care to have an internet quota in order not to have any problems with online exam. I attend exams on phone. I pray that not to have calls during exam, and I try to deal with systemic difficulties."

The transcript below was classified to the Duration category:

P4: "The unfairness of exam is challenging me. Also, as a student of a mathematics department, it takes a lot of time to solve and save question. Even system that sends questions mixed, sometimes only sends difficult questions and one type of questions. The time given for us to answer questions is not enough."

Student view from Feeling demoralized by technical problems during exam code is given below:

P35: "When I have a problem with computer during exam, I get very excited and this situation is very demoralizing for me."

The following example represents student concerns if their answers were recorded correctly:

P5: *“During the exam, sometimes the system was very intense, so answers to questions may not be recorded, internet may be cut off. So when I have this kind of problem I wonder whether my answers were recorded correctly.”*

View from Inability to convey problem experienced in exam to instructor code is given below;

P24: *“I take a screenshot during exam and send an e-mail to instructor after exam. Unfortunately, when there is a problem during exam, there is no solution at that time”.*

According to the third research problem of “What are measures that can be taken to solve the problems encountered in online exams?”, Suggestions for Solving Online Exam Problems theme extracted from interviews and Assessment, Technical System, Content of Exam, Communication, Time categories were specified (Table 3).

Table 3 indicates that in assessment category students suggest assigning homework, fair distribution of questions, announcing exam earlier, asking short answer questions and make-up exams. In Technical System category students suggest returning to previous questions in exam, taking measures in advance for problems related to system, strengthening the substructure of system, controlling technological device to be used in exam, checking internet connection, reducing number exams held at the same time and doing a short mock test before exam to determine if system is working. In Content of Exam category students suggest providing necessary information, ensuring compatibility of exam questions with lecture taught in distance education, being informed about all the details (content, type, duration of the exam, etc.), taking exam in a small number of groups, not including unfinished subject to exam content, checking exam items in randomly assigned questions. In communication category students suggest reaching correct answers, providing sufficient feedback, having contact with lecturer during exam. In time category they suggest more time to complete exam.

The transcript below represents an example of students’ views about;

Assigning homework code:

P42: *“I don't think online exams are fair. I think it is not suitable for equal opportunity in education. I believe that having final exams with homework as last year will be better especially for students with limited opportunities.”*

Returning to previous questions in exam and Fair distribution of questions as easy and difficult:

P43: *“Practices such as not being able to return to questions have really worn out many of my friends, especially me. I always wonder if questions are too difficult, how long should I devote to this question, I find myself in an unnecessary stress. In some exams, when my first question is a difficult question, I lose all my enthusiasm and I have to worry about education. This process was really exhausting.”*

The transcript below shows an example of students’ views related to the Contact lecturer code:

P15: *“An arrangement should be made in order to contact to instructors faster during exam.”*

The next transcript indicates students’ need for feedback to their responses and mistakes after the exams:

P37: *“There should be a return between questions and we should see our mistakes after exam. After all, if we do not know what we are doing wrong, we will continue with mistakes we know are right.”*

Following, an indicative example of students’ need for providing necessary information before the exam is given:

P2: *“Assessment should be made before exams and it should be ensured that time will be sufficient for questions. Information should be given about the number of questions and their content.”*

**Table 3. Basic themes, categories and codes regarding problems encountered in online exams**

Theme	Category	Code	Participants	f
Suggestions for Solving Online Exam Problems	Assessment	Assigning homework instead of multiple choice exams	P4,P6,P8,P9,P10,P11,P13,P14,P17,P21,P23,P25,P26,P30,P34,P38,P41,P42	18
		Fair distribution of questions as easy and difficult	P1,P3,P5,P6,P21,P29,P30,P32,P43,P49	10
		Not announcing exam results too late	P6,P9,P14,P16,P22,P38,P44	7
		Asking short answer questions	P4,P7,P13,P26,P34	5
		Make-up exams should be done	P5,P17,P28	3
	Technical System	Returning to previous questions in exam	P1,P2,P4,P5,P11,P13,P16,P17,P22,P25,P26,P37,P38,P39,P43,P53,P54,	17
		Universities should take measures in advance for problems related to system	P3,P4,P7,P11,P16,P17,P21,P24,P29,P30,P32,P36,P39,P47	14
		Strengthening substructure of system	P2,P3,P7,P13,P17,P19,P22,P25,P36,P42,P51	11
		Controlling technological device to be used in exam	P3,P8,P9,P15,P28,P33,P49	7
		Checking internet connection.	P7,P12,P28,P31,P45	5
		To reduce the number of exams held at the same time	P9,P17,P23	3
		Doing a short mock test before exam to determine if system is working	P32,P55	2
	Content of Exam	Providing necessary information before exam	P2,P3,P7,P8,P11,P24,P16,P21,P23,P2,P32,P33,P34,P42,P45,P50,P52	18
		Compatibility of exam questions with lecture taught in online education	P7,P18,P25,P29,P36,P44,P47,P52,P55	9
		Students should be informed about all the details (content, type, duration of the exam, etc.)	P5,P8,P19,P21,P38	5
		Takin exam in a small number of groups	P11,P42	2
		Not including unfinished subject to exam content	P4,P18,	2
		Checking exam items in randomly assigned questions	P2,P36	2
	Communication	The opportunity to reach correct answers should be offered after exam.	P1,P4,P8,P16,P20,P22,P23,P27,P29,P32,P33,P37,P45,P52,P54,P55	16
		Sufficient feedback should be provided by instructor about exam	P4,P5,P7,P17,P25,P28,P29,P32,P33,P36,P47,P49,P50,P51,P54	15
		It should be possible to contact instructor during exam	P9,P15	2
If there is a problem during exam, feedback should be obtained for solution		P7,P17	2	
Time	Longer time to complete exam	P6,P14,P23,P40,P52	5	

## Conclusions

During preparation process of online exams, the most frequently expressed problem by undergraduate students were checking course materials/documents, internet problems, not focusing online exams and insufficient information about exams. Less expressed problems were checking whether technological tool to be used is working or not, lack of course document and variability in exam date. It is important for students to control hardware, software and social environment before exam. The reason for this may be that students want everything ready before exam in order not to encounter any problems during exam, and these checks make them feel more comfortable. Certainly course materials facilitate learning and ensure its permanence (Bozpolat & Arslan, 2018). The more qualified and problem-free software and hardware in learning environment, helps effective education (Hentea, Shea & Pennington, 2003).

Internet related problems can be considered as the worst problem since it's out of control of students. For example, loading of exam questions can be delayed, students may not find exam questions on webpage and for students there is nothing to do at that moment. By all means, after studying long hours, these kind of trouble is a problem. This situation may cause student not to attend online exam or exam may be declared invalid (Çallı, Torkul & Taşbaşı, 2003). Internet connection and technical infrastructure problems related to system should be resolved for effective teaching and assessment. Similar to this finding, internet related problems and necessity of solving these problems are stated in literature frequently (White & Hammer, 2000; Çelen, Çelik & Seferoğlu, 2011; Kınalıoğlu & Güven, 2011).

Students have problems about focusing on online exams. The reason for this may be that students are in a different place and communication is more difficult in online exams, unlike traditional assessment. Due to difference in time, place and features, a new and different exam for student may not be adopted very quickly. Being assessed with an exam different from exams students used to attend for many years is a difficult process. Instructors need to know these pedagogical features of student and prepare and apply online exams accordingly. Only in this way online assessment can be used effectively both for learning objectives and for applying knowledge. The instructor should know pedagogical reasons of not focusing on online exams and they should also use assessment techniques accordingly or existing traditional assessment techniques can be modified to be suitable for online assessment (Robles & Braathen, 2002). Kerka & Wonacott (2000) claim that online assessment is more difficult than face-to-face assessment since student's non-verbal cues cannot be seen online. In online exams student often feels isolated, thinks that assessment process is not personalized and that assessment is out of teacher's control. Student also feels anxious about technical problems he may experience during exam. Moreover, constantly looking at computer screen may cause problems for student to concentrate after a while.

Another problem for students is insufficient information about exams. Getting information about exam, knowing which content is included in exam helps draw the boundaries of exam and facilitates exam preparation process. Mostly students want to know what subjects will be included in exam, how many questions will be asked, and how much time will be given for answers. Otherwise, if exam includes an uncertainty for student, both anxiety level increases and desire to work decreases. For this reason, students should be informed beforehand about online exam system and its usage, so they know what they can do at the time of exam (Torkul, Kibar & Tasci, 2004). To solve this problem, moreover, students should have opportunities to contact with instructor. In fact, especially with developing technology, students can communicate more easily with instructor. From time to time, it will also be useful for students to meet with instructor (Hentea, Shea & Pennington, 2003) and have information about exam details (Tüfekçi, Ekinci & Köse, 2013). To make online education to be permanent, interaction between students and educators should be increased (Celen, Çelik & Seferoğlu, 2011).

Moreover, as another problem variability in exam date has also a negative effect for students. Students are disturbed by sudden change in exam date, because this change may not be suitable for students' own study schedule. An early date for an exam to be held on a later date may result in student's inability to complete his studies or delay in exam date to may cause student's effort to be wasted. Student may think that they will forget what they know or work in vain too early.

Students also need to check whether technological tool to be used is working or not before exam. The reason for this situation is a desire not to experience negative impact of any technological problem during exam. It is obvious that online education requires much more time and technology than traditional education (White & Hummer, 2000). So students should be provided with necessary knowledge. Hillier & Fluck (2017) claim that technological systems used in online exams must be flexible, common and compatible. Technological tools' quality creates greater success of online exam system.

In application process of online exams, problems the most frequently expressed by undergraduate students were inability to return to previous question, limited time to respond questions and more excitement. Less expressed problems were feeling demoralized by technical problems, concern whether answers were recorded correctly, inability to convey problem experienced in exam to instructor.

In application of online exam, students complain about inability to return to previous question and they also suggest to return to previous question. They also have problems with exam duration. In traditional exams, when a student cannot find the answer to a question at the time of exam, he passes that question and returns to question at the end of exam. Exam duration is long enough for revision of answers. However, it is an important disadvantage for a student to see question only once in online exam and not to return to question he could not answer. The reason of not allowing to return to previous questions and giving limited time for answers may be possibility of cheating. Students are likely to cheat in online exams. For example, they can communicate with each other on social media during exam or they can search for answers to questions asked in exam from another laptop (Ryznar, 2020). Today, technological developments cause students to cheat more easily in exams. In addition, another reason is that student can search for answer to unanswered question by using another browser or technological device. He can go back and answer that question before exam finishes. This harms exam security considerably. Instructors and universities can control these unethical behaviours for example, by using cameras during online exams or they can check whether student has taken exam himself or not from their IP addresses (Cerimagic & Hasan, 2019). Although it is a problem for student to not return to previous questions, ensuring exam security is the first priority for institutions, equality and justice for all students should be given importance in online exams (Robinowitz, 1995; as cited in Robles & Braathen, 2002; Shraim, 2019; Williamson, 2018).

Students stated that they feel more excited in online exams compared to traditional exams. In online exam, student attend exam without face to face communication, in a separate environment from his friends and instructor, and in a relatively shorter time so, if he encounters any problem, he may worry that he will not be able to express himself and may feel uneasy. As students stated lack of communication is an important deficiency of online exams. Hentea, Shea & Pennington (2003) and Kinalioğlu & Güven (2011) claim that lack of face to face communication affects both distance education and assessment negatively. Similarly, Aragon & Johnson (2008) and Bunn (2004) stated that poor communication prevents students attending online education programs. They view online communication as incomplete or ineffective. They consider lack of face-to-face communication as a barrier which creates anxiety. Moreover, different environment can be the most important reason for online exam anxiety (Tüfekci, Ekinci & Köse, 2013). Stowell & Bennett (2010) stated that students who have exam anxiety in face-to-face exams, increase their anxiety levels more in online exams. And they also suggest doing online exams in classroom can be effective in face-to-face education process to reduce online exam anxiety. Infact, it is possible to increase success of student in online exam because

with online exam, student can perform better by taking exam at any time according to his / her sleep routine and mood (Hartley & Nicholls, 2008).

In a study conducted by DeSouza & Fleming (2003), students who attended online exams were more successful than those who attend exams in classroom. Another reason for excitement in online exams can be related to online courses. In this study, some students stated that they felt as if they had not fully learned subjects in online courses they think they are not ready for online exam. So, they feel anxious. In a study conducted by Fakcharoenphol, Potter & Stelzer (2011) students with high academic success were more eager to take online exams. So, a student with low academic success may not want to take online exam, fearing that she may get low marks in online exam. A student who thinks she has learned will have no problem taking online exam.

Students who are worried about online exam may also feel nervous due to problems such as technical difficulties and connection issues. As stated above findings of this study may cause anxiety; that feeling demoralized by technical problems, concern whether answers were recorded correctly and inability to convey problem experienced in exam to instructor. Minimizing these problems can also reduce anxiety in online exam. And midterm exams can be done online as formative assessment, they can help students see their weaknesses and strengths and reduce their anxiety (Fakcharoenphol, Potter & Stelzer, 2011).

Not having contact with instructor is another problem. Instructor is very effective as a connection between student and course, can solve any problem related to exam, end student's worries, and affect student's attitude towards course. Therefore, instructor is the most competent person regarding exam. Students want to reach instructor about a problem related to exam at any time. Aragon and Johnson (2008) claimed that not having contact with instructor can affect online education negatively as withdrawing from online course. To solve this problem, Kashy, Thoennesen, Tsai, Davis & Wolfe (1997) stated that technological opportunities can be used to have contact with students and instructors. Certainly, it is not possible for all students to reach instructor, but by determining class representatives, problems about online exam can be delivered to instructor with technological tools. The effective use of technology in educational environment provides instructors with considerable convenience in terms of time, grading and recording, while increasing success of student.

In suggestions to solve these problems, the most frequently expressed suggestions were, assigning homework instead of exams, returning to previous questions, providing necessary information before exams, sufficient feedback from instructor, strengthening substructure of system, fair distribution of easy and difficult questions.

Students stated that they prefer homework instead of multiple choice questions. The reason for instructors for using mostly multiple choice questions can be usefulness of multiple choice exams. In online exams, questions and answer options can be designed to be different for each student, but this is more time consuming in traditional exams. In addition, educators make exam analysis easier (Dickinson, 1997). For example, after a multiple-choice online exam, results of exam can be projected on a screen that students can see after a short time, and answers to questions can be examined. Student can immediately get feedback about exam. At the same time, this situation provides convenience for instructor in terms of time and effort (Wolfson, Veloski, Robeson & Maxwell, 2001; Dirks, 1998).

Suggestions about returning to previous questions and providing necessary information before exams were mentioned above. Another suggestion was having sufficient feedback from instructor. As an important problem it is clear that students need to get feedback after online exams. The students' making this suggestion shows that they could not get enough feedback. This may be due to high workload of instructors after online exams, students not being able to go to campuses due to the pandemic, and not being able to meet instructor. The educational setting can be face to face or online, but assessment should provide immediate feedback to student. In this way, student can understand that he has learned subject or not. In online exams, instructors need to make their assessment

according to a specific strategy and make sure that feedback given to student is effective and understandable by student (Arend, 2007). The basic criteria of online courses are to achieve goals of course, and main purpose of online assessment should be to measure learning outcomes and provide feedback to student (Robles & Braathen, 2002; Kerka & Wonacott, 2000; Kashy, Thoennesen, Tsai, Davis & Wolfe, 1997).

Problems about online exams and suggestions of students also refer to exam security. Compared to face-to-face exams, students think that security of online exams is low. Due to security problems that may occur in online exams, many institutions make their exams in face-to-face environments. However, these exams are in conflict with distance education's understanding of education independent of space and time (Bozkurt & Uçar, 2018). This problem can be solved with the latest developments in technology with the help of exam security systems (Kınalıoğlu & Güven, 2011; Glater, 2006; Cerimagic & Hasan, 2019) or biometrics face recognition for security of online exams can be used (Sarrayrih & Ilyas, 2013; Smith, Clarke, Carmona & Cerimagic, 2017). Using such a system will both speed up identity control process, and exam security will be provided by fingerprint or face recognition. Students also think that biometric and information-based identification methods are more reliable in terms of exam security (Bozkurt & Uçar, 2018; Keskin & Güneş, 2015). To solve security problems that may occur in online exams Williamson (2018) suggests some measures such as not using exam questions available on internet, ensuring students answering only one question on each page in exam, asking questions in form of short articles, giving students enough time to answer questions, limiting students' screen for not seeing questions as a whole, and constantly changing questions and choices. However, Clyman & Orr (1990) and Luecht, Hadadi, Swanson & Case (1998) claim that online exams are safer than traditional exams. The reason for this situation may be that these studies were in the past years and they were assessed according to technological conditions of those periods.

Strengthening substructure of system is another suggestion of students. Substructure expression here refers to technology that includes internet and online exam system. Technical problems can be highly annoying and stressful for students and for this reason online exam process can be viewed as more difficult for them. For this reason, in order to avoid problems in the online exam, which is directly connected to technology, institutions should offer all their facilities without any problems and not expose students to technical problems. Williamson (2018) states that potential possibilities of online education cannot be reached with traditional teaching and assessment methods. Although universities that have shifted from traditional to online education have started to make some changes in their teaching methods, they are still not aware of what kind of problems they may encounter with online assessment. For example, one of these problems is possibility of resorting to unethical behaviour by students who take exams on their own computers at home. Therefore, universities and institutions should take necessary precautions for problems in online exams.

An important suggestion of students was fair distribution of easy and difficult questions. It is clear that students have problems with features of question. In order to solve problems about features of questions instructors may check their colleagues' questions before exam. In online exam system developed by Tüfekçi, Ekinci Köse (2013) teachers were enabled to comment under questions in question bank consisting of questions prepared by instructors. The implementation of a system in this way can enable questions prepared in online exams to be examined by different instructors.

Students also stated that in online exams sometimes they encounter questions about topics not covered in online course. There seems incompatibility of questions and course content. Similarly, Robles & Braathen (2002) stated that, students are asked questions about topics that are not among objectives of course in online exams, and this is an important problem. This situation is both very disturbing for student and causes instructors to go beyond the goal of assessment. To solve this, student should be informed about goals set at the beginning of lesson and should be assessed only in accordance with these goals. The compatibility of course and assessment process with each other will increase success of online education and online exams.

As students stated questions in online exams mostly in form of multiple choice. However, using different question types will be more effective for assessment since it has a multidimensional purpose, multiple methods and different question types should be used in online exams (Galante, 2002; Kerka & Wonacott, 2000; Tüfekçi, Ekinci & Köse, 2013).

Although online education was used before the COVID-19 pandemic, it was used compulsorily in the pandemic period all over the world and in every different discipline. Although users of online education before the pandemic had basic information (Keegan, 1988), what kind of knowledge both students and teachers had on this subject during pandemic period and how they tried to adapt to this difficult process were obtained from results of this study.

## Recommendations

Online education environment offers students much more than textbooks and classroom education. Although many educators use online education and internet technologies effectively, they prefer traditional test method in assessment phase. Results of this study indicated that students have some problems in online exams. Further research can be done about online exams. For instance, alternative assessment processes that can be done in online education should not be approached with prejudice. Online assessment can be done with different assessment tools such as discussion groups, electronic portfolios, self-assessment tests, and writing assignments. Additional research can be conducted. Self-assessment is also an important element that positively affects assessment process in online courses. While instructor's assessment of students is basis for assessing students, it is also necessary for students to assess their own learning (Robles & Braathen, 2002). For further research self-assessment can also be conducted. In this way, student will realize whether he will be able to move on to next stage and will be able to repeat lesson if necessary, and will be able to measure his own learning and success. For this reason, it would be useful for teachers to include self-assessment tests that student can assess himself. Moreover, studies and results obtained for online education during pandemic period on a country basis can be compared in future studies.

## Limitations

This study is limited to the views of undergraduate students studying at two different universities in 2020-2021 academic year in Turkey. Since this study was conducted based on views of 55 undergraduate students, obtained results are limited only to views of these participants. The study has no aim to reach generalization.

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