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Rethinking Online Assessment Quality From Pre-service Teachers Perspectives

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ABSTRACT

This study examined the problems that pre-service teachers face in the online assessment process and their suggestions for solutions to these problems. The participants were 136 pre-service teachers who have been experiencing online assessment for a long time and who took the Foundations of Open and Distance Learning course. This research is a phenomenological study conducted with a qualitative research approach. The pre-service teachers completed an open-ended questionnaire prepared by the researchers to express the problems they encountered in the online assessment process and their suggestions for solutions. The pre-service teachers made evaluations within the framework of the factors considered important in the quality of online assessment. The data were analyzed using descriptive analysis. The findings of the study were discussed and suggestions were made for future studies.

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INTRODUCTION

The 21st century has brought about significant changes and transformations in the teaching process as a period of the rapid development of online technologies. Online technologies are actively used in both face-to-face and distance education. The pandemic process we have recently experienced has moved the teaching process to an online environment, and distance education has been introduced at all levels. Although face-to-face teaching has been resumed today, blended teaching practices have increased noticeably with the increase in online teaching experiences of teachers and students (Hilliger et al., 2022). In Turkey, while some of the courses in higher education are taught online, face-to-face courses at other levels are conducted by utilizing online content and activities. Although online learning has many advantages for students, the assessment of students differs from face-to-face teaching, and instructors need to adapt their assessment methods to the online mode (Abd Elgalil et al., 2023). Assessment has many functions, such as measuring students' achievement, supporting learning, ensuring academic integrity and revealing the effectiveness of the teaching process (Nguyen, 2023). In addition, assessment is an essential tool for identifying and improving students' performance regardless of the preferred mode of instruction and is a source of data that policymakers and teachers often utilize to provide better learning experiences (Ibrahim et al., 2022). In this context, assessment is a process that researchers and teachers are constantly working on and striving to develop different strategies. The active use of online technologies in teaching gives the opportunity to vary traditional assessment approaches. The existence of many Web 2.0 tools that enable online assessment offers alternative options for evaluating students' performances. This situation encourages teachers to use online assessment tools in the course process (Cumhur & Çam, 2021).

As a method that can be used in face-to-face, distance or blended learning modes, online assessment is becoming increasingly common, with many features that facilitate teachers' assessment processes (Webb & Ifenthaler, 2018). Online assessment can facilitate data analysis, speed up reporting processes, and improve assessment accuracy. However, there are academic, technical and ethical issues for teachers and students (Lee et al., 2022). During the pandemic, online assessment was actively used at all levels of education and teachers, and students experienced online assessment in all its aspects. Researchers have examined teachers' and students' experiences and appropriate methods for online assessment (Nguyen, 2023). Online assessment is a process that requires careful preparation and is influenced by many factors, such as the nature of instruction, types of questions, content of items, and mode of administration (Lee et al., 2022). Surahman and Wang (2022) showed that conducting online assessment in a valid and reliable manner is essential for achieving consistent results. It is also important to choose the type of assessment that is appropriate to the course design and objectives (Sabrina et al., 2022). Thathsarani et al. (2023) showed that the type, format and method of online assessment as an important component of teaching can affect students' academic performance. The design of the online assessment process is important in terms of achieving the goals of teaching, and in this direction, it is seen that there is a need to take necessary measures to reduce students' test anxiety, maintain academic honesty, and solve technical problems (Ndlovu et al., 2023). This study examined the problems encountered by pre-service teachers in the online assessment process and their suggestions for solutions to these problems.

LITERATURE

The digital transformation in the teaching process has popularized online assessment for instructors and students, leading to its widespread adoption (Elgalil et al., 2023). Online assessment is a systematic means of collecting information about students' dispositions, behaviors, and performances in the learning process (Heil & Ifenthaler, 2023). The quality of online assessments affects students' engagement and learning outcomes (Makina, 2022). Online assessment has advantages such as quick feedback on students' performance, geographically flexible access, the ability to retake assessment tests, and the ability to self-assess and improve (Thathsarani et al., 2023). In order for an online course to achieve its goals, the teaching, learning, and assessment processes should be compatible with each other and serve the same purpose (Pu & Xu, 2021). Accordingly, different assessment methods are utilized in the teaching process. Although summative assessment is a common strategy as an assessment

format, it is recommended to use formative assessment more actively (Pu & Xu, 2021). Online test and quizzes, open-ended exams, assignments, online presentations, projects, portfolios, collaborative writing tasks, levels of participation in online courses, and simulations are preferred as assessment types (Guangul et al., 2020; Lee et al., 2022). Teacher, peer, self-assessment, and automated system assessment can be used as assessment modes (Akcay et al., 2021). In addition, game-based assessment, student-adaptive tests, and AI-supported learning analytics are among the tools used to monitor students' performance (Surahman & Wang, 2022).

There are many alternatives in terms of online assessment format, type, and mode. However, different problems and concerns about online assessment are expressed by teachers and students. Nguyen (2023) examined undergraduate students' views on online assessment and found that there are risks to academic honesty such as cheating, plagiarism, collusion, fabrication, and subjective evaluation. It was suggested that stakeholders should have sufficient academic knowledge about online assessment, and universities should make arrangements for their infrastructure and guidelines. Lee et al. (2022) found that university students experienced problems with internet connections, technical problems with computers, and feedback during the online assessment process. The students suggested that quick support should be provided and measures should be taken to ensure academic honesty. Yıldırım and Tekel (2023) examined pre-service teachers' views on online assessment. It was seen that pre-service teachers were evaluated by methods such as online exams, assignments, participation, and presentations. In terms of online exams and assignments, disadvantages such as security, cheating, anxiety, limited time, and unfairness were expressed, and it was suggested that online assessments should be designed according to the nature and content of the course. Akçay et al. (2021) examined the views of pre-service teachers on online peer assessment and showed that using teacher, peer, and self-assessment together can provide stronger validity and objectivity. Elgalil et al. (2023) showed that students' satisfaction levels with online assessment are low and revealed that there are disadvantages for students in the online assessment process, such as high cost, lack of concentration, and only knowledge-based exams. Surahman and Wang (2022) examined studies on academic dishonesty and reliable assessment in online learning. At the end of the study, they found that there are academic dishonesty methods such as plagiarism, cheating, and collusion. In terms of reliable assessment, the use of plagiarism control, artificial intelligence, and learning analytics tools was emphasized. Ndlovu et al. (2023) investigated students' perceptions of online assessment and showed that measures should be taken to protect academic honesty, reduce technical problems and assessment-related concerns, and provide academic support.

Heil and Ifenthaler (2023) suggested that guidelines should be created to determine the appropriate mode, format, and types for designing the online assessment process and to get feedback from stakeholders. Hilliger et al. (2022) stated that guidelines should be prepared and the possibilities of technology should be utilized to reduce academic misconduct in the online assessment process. Thathsarani et al. (2023) emphasized the importance of focusing future research on improving the quality of online assessment and reducing students' anxiety. When the studies on online assessment are examined, it is seen that they are concentrated during the pandemic period. It can be said that the studies focus on perceptions, satisfaction, and problems related to online assessment. In this study, the opinions of pre-service teachers about the problems identified in previous studies were taken, and they were asked to make suggestions for solving these problems. Pre-service teachers' suggestions on online assessment can provide important data for policymakers, researchers, and educators. The aim of this study is to examine pre-service teachers' perceptions of the online assessment process. In line with this purpose, the research questions are as follows:

1. What are the types of online assessments that pre-service teachers experience?
2. What are the problems that pre-service teachers face in the online assessment process?
3. What are pre-service teachers' suggestions for solving the problems they face in the online assessment process?

METHODS

This study is a phenomenological study conducted with a qualitative research approach. Phenomenological studies investigate individuals' perceptions, reactions, and experiences

towards a particular phenomenon (Fraenkel et al., 1993). It gives researchers the opportunity to understand and evaluate the world in which participants live through their eyes (Annamalai et al., 2022). Participants' behaviors and tendencies can be explored in a natural environment without the intervention of the researcher (Akçay et al., 2021). A reflective process that provides an in-depth examination of the experiences of the students was tried to be carried out (van Manen, 2007). In this regard, we aimed to examine in detail the problems that pre-service teachers perceive regarding online assessment, a phenomenon that they directly experience, and the solution suggestions for these problems (Yıldırım & Tekel, 2023).

PARTICIPANTS

Purposeful sampling method was used to determine the participants. Purposeful sampling, which is frequently used in qualitative research, is the selection of situations that will enable in-depth information collection in line with the purpose of the research (Büyüköztürk et al., 2008). In this study, students were expected to propose solutions to the problems they experienced in the online assessment process. The participants of the study were 136 pre-service teachers (81 female and 55 male) studying in the 4th grade at a state university. The pre-service teachers took online courses for two semesters during the pandemic and one semester due to the earthquake in Turkey on February 6, 2023. Currently, pre-service teachers are also taking some elective courses online. Accordingly, pre-service teachers experienced face-to-face, distance, and blended learning. In addition, the data for the study were collected from pre-service teachers who took the Foundations of Open and Distance Learning course. In this framework, pre-service teachers made evaluations within the framework of the pedagogical formation they acquired during the teaching process.

PROCEDURE

The research was conducted in the fall semester of the 2023–2024 academic year in the Foundations of Open and Distance Learning course. Pre-service teachers studying in different departments learned about the historical development of open and distance learning, theoretical foundations, current practices, and online assessment in this elective course. At the end of the semester, pre-service teachers expressed the problems they encountered in the online assessment process and their suggestions for solutions to these problems. The pre-service teachers wrote their explanations about online assessment on the form distributed to them. The researcher made a presentation to the pre-service teachers on how to fill out the open-ended questionnaire. The pre-service teachers completed the open-ended questionnaire voluntarily and feedback was received from 125 pre-service teachers. After the data were collected, the data analysis and reporting phase began.

DATA COLLECTION TOOL

An open-ended questionnaire was prepared to examine pre-service teachers' perceptions of online assessment processes. The open-ended questionnaire consists of two parts: demographic information and an evaluation of the online assessment. In the demographic information section, data were collected on gender, major, mode, type, and format of assessment they experienced in the online learning process. The pre-service teachers wrote about the problems they encountered in terms of the factors affecting the quality of online assessment, gave detailed information about these problems, and expressed their suggestions for solutions. Table 1 shows the prominent factors in the quality of online assessment identified through the literature review.

The pre-service teachers wrote a list of the problems they experienced in terms of the factors in Table 1 and their suggestions for solutions. Two experts in the field of instructional technologies were consulted in the preparation of the open-ended questionnaire form. The field experts evaluated the form in terms of form and content, and necessary arrangements were made within the framework of the feedback received. A section of the form is shown in Figure 1.

As shown in Figure 1, the pre-service teacher marked the factor that was a problem for him/her in the online assessment, then gave information about the problem he/she experienced and wrote his/her suggestions.

FACTORS	REFERENCES
Format	Heil & Ifenthaler, 2023; Hickey, 2022; Hilliger et al., 2022; Lee et al., 2022; Makina, 2022
Types	Heil & Ifenthaler, 2023; Hilliger et al., 2022; Lee et al., 2022; Lin et al., 2023; Makina, 2022; Mostafa, 2023; Thathsarani et al., 2023; Yıldırım & Tekel, 2023
Modes	Heil & Ifenthaler, 2023; Ibrahim et al., 2022; Lee et al., 2022; Makina, 2022; Shanley et al., 2022
Connection	Lee et al., 2022
Tools	Lee et al., 2022
Academic Dishonesty	Hilliger et al., 2022; Lin et al., 2023; Mostafa, 2023; Surahman & Wang, 2022; Yıldırım & Tekel, 2023
Time	Nguyen, 2023; Yıldırım & Tekel, 2023
Environment	Nguyen, 2023; Yıldırım & Tekel, 2023
Feedback	Lee et al., 2022; Makina, 2022; Mostafa, 2023; Nguyen, 2023; Shanley et al., 2022; Yıldırım & Tekel, 2023
Instructor Competency	Lee et al., 2022; Mostafa, 2023
Software	Makina, 2022; Surahman & Wang, 2022; Yıldırım & Tekel, 2023
Comprehensiveness	Yıldırım & Tekel, 2023
Practical Course	Nguyen, 2023
Anxiety	Nguyen, 2023; Yıldırım & Tekel, 2023
Lack of informative	Heil & Ifenthaler, 2023

Table 1 Factors of Online Assessment.

X	Factors	Problems	Suggestions
X	Format	• Only result-oriented assessments were made. • A Summative assessment did not give us the opportunity to see our shortcomings.	• Formative and summative assessment should be used together. • Assessment should be varied with online quizzes.

Figure 1 Open-ended Questionnaire Form.

DATA ANALYSIS

The data collected in the study were analyzed using descriptive analysis. In descriptive analysis, data are classified, interpreted, and presented according to predetermined themes (Yıldırım & Şimşek, 2013). The themes of the data analysis are the factors that can affect the quality of the online assessment, as shown in Table 1. The data analysis process was conducted within the framework of Guba and Lincoln's (1982) criteria of credibility, transferability, dependability, and confirmability in qualitative research. In terms of credibility, the researcher was also the instructor of the Foundations of Open and Distance Learning course where the data were collected. The researcher led the course on the theoretical foundations of online learning and assessment for one semester with the participants. In order to avoid misunderstandings while analyzing some complex statements, the relevant student was called, and codes were created together, and participant confirmation was obtained. In terms of transferability, a purposeful sampling technique was used to select participants more suitable for the purposes of the study. The fact that the participants were pre-service teachers from different departments meant that their pedagogical backgrounds would be more appropriate to bring solutions to the problems encountered in the online assessment process. In addition, information about how the participants were identified, the setting, and the process were shared openly. In terms of reliability and objectivity, the themes of the data analysis were obtained from similar studies by reviewing the literature. The explanations of the pre-service teachers were analyzed by two experts, and the consensus was determined to be 93%, according to Miles and Huberman (1994) formula (reliability = consensus/(consensus+disagreement)).

FINDINGS

The data on the assessment format, type and, mode that pre-service teachers experienced in the online assessment process are shown in Table 2.

Table 2 Students' Online Assessment Experiences.

FACTORS	TYPES	FREQUENCIES
Format	Summative Assessment	125
	Formative Assessment	18
Type	Online Test	125
	Open-ended exam	125
	Online Assignment	125
	Group Project	56
	Online Quiz	34
	Online Presentation	22
	Attendance in Online Activities	12
Mode	Teacher Assessment	125
	Peer Assessment	24

Summative assessment was the most frequently used assessment format, but formative assessment was experienced by a few pre-service teachers. Online tests, open-ended exams, and assignments were the types of online assessments that all of the pre-service teachers experienced. Group projects and online quizzes were used less frequently. Teacher assessment is an assessment mode experienced by all students. The number of pre-service teachers who experienced peer assessment is limited. Table 3 shows the problems and suggestions of pre-service teachers regarding the online assessment format.

Table 3 Online assessment format.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Format	Result-oriented assessment	"The instructors evaluated our performance mostly in a result-oriented manner. (S15)"	71	Formative assessment should also be used.	"Formative assessment that is process-oriented should be used. (S15)"	65
	Assessment did not provide an opportunity to correct deficiencies.	"Instant assessments did not give us the opportunity to correct ourselves. (S21)"	39	Assessment should be varied with online quizzes.	"Instructors should vary assessment methods with online quizzes in addition to exams. (S21)"	50
	The learning process was ignored.	"Summative assessment does not take into account the learning process. (S56)"	13	Adaptive online assessment supported by artificial intelligence should be carried out.	"Student-based evaluation supported by artificial intelligence can be used. (S56)"	35
	Assessment was based on a single criterion.	"The instructors evaluated our performance based solely on the exam score. (S98)"	9	Online activities attendance should be taken into account.	"Instructors should also take class attendance into consideration when evaluating performance. (S54)"	20
	Assessment process was boring.	"The evaluation format was boring. (S54)"	7			
	Summative assessment was concerning.	"The instant performance evaluation was concerning. (S8)"	5			

As shown in Table 3, pre-service teachers saw only result-oriented assessment, which is a feature of summative assessment, as a problem. The fact that online summative assessment does not give the opportunity to correct deficiencies is one of the problems expressed by pre-service teachers. Ignoring the learning process and evaluation based on a single criterion are the problems expressed by a smaller number of pre-service teachers. The pre-service teachers suggested online formative assessment, enrichment with online quizzes, and online assessment that can be adapted according to the level of the student. Table 4 shows the problems and suggestions of pre-service teachers regarding online assessment types.

Table 4 Type of online assessment.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	F	STATEMENTS
Type	The assessment types were not various.	"Instructors generally preferred multiple-choice exams. (S67)"	26	The type of online assessment used according to the courses should be varied.	45	"Different question types should be used in online exams. (S67)"
	Writing answers to open-ended questions was time-consuming and difficult.	"I was unable to complete some open-ended exams on time. (S92)"	21	Gamification-based online assessment can be done.	29	"Online assessment can be made fun with gamification. (S92)"
	Multiple-choice exams were not productive.	"Multiple-choice exams were superficial and not productive. (S78)"	17	Answer criteria should be written more clearly in open-ended questions.	15	"Criteria should be determined more clearly in open-ended exams. (78)"
	Some questions and answers were confusing.	"In some exams, the questions were complex. (S45)"	8	Portfolio and online presentation can be used.	11	"Alternative exam types, such as online presentations, may be used. (S15)"
				Simple and understandable questions should be written.	10	"Questions in exams should be clear and understandable. (S45)"

In their evaluation in terms of assessment type, pre-service teachers expressed problems such as the lack of online assessment types, the time-consuming and difficulties of open-ended questions, and the inefficiency of multiple-choice questions. For these problems, it was suggested that the type of online exam should be varied, gamification-based assessments should be made and the criteria for answering open-ended questions should be given in a more understandable way. Table 5 shows the problems and suggestions of pre-service teachers regarding the online assessment mode.

Table 5 Online assessment mode.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Mode	Since the number of students was too large, the instructor assessment was not sufficient and fair.	"In crowded classrooms, teacher evaluation alone is not enough. (S27)"	40	Peer assessment should also be used in performance-based courses.	"Peer evaluation can be used to evaluate performance. (S27)"	33
	There was no student performance tracking.	"Instructors did not take into account my performance in online courses. (S33)"	24	Self-assessment should be used.	"We may be given the opportunity to evaluate ourselves. (S33)"	14

As seen in Table 5, in terms of online assessment type, there are problems such as the instructors' inability to carry out an adequate and fair process because they have to evaluate too many students and the inability to monitor student performance. The pre-service teachers suggested that instructors should use peer assessment and self-assessment. Table 6 shows the pre-service teachers' evaluations about the internet connection during the online assessment process.

FACTOR	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Internet Connection	Internet connection speed was insufficient.	"The Internet connection speed was insufficient. (S68)"	32	Internet infrastructure should be strengthened	"Institutions should strengthen their internet infrastructure.(S68)"	30
	There were interruptions in the internet connection.	"I experienced a disconnection from the internet during online exams. (S74)"	24	Mobile internet should be faster and free	"Mobile internet should be faster and free. (S74)"	16
	Internet connection problems caused me to lose time during exams.	"The disconnection of the internet connection caused me to lose time during the exam. (S5)"	18	Systems that can operate asynchronously should be developed	"Even if the internet connection is interrupted, we should be able to continue the exam for a while. (S5)"	15
				Make-up exams should be held for students who have problems with their internet connection.	"Make-up exams should be held. (S100)"	10

Table 6 Internet connection during the online assessment process.

Pre-service teachers complained about the slow internet connection and interruptions. It was observed that problems in the internet connection caused loss of time. It was suggested to strengthen the internet infrastructure and mobile internet. It was also suggested to design systems that can continue asynchronously when there is a break in the internet connection. Table 7 shows the evaluations in terms of tools in the online assessment process.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Tools	It was difficult to take the exam via mobile phone.	"I took the exams on my mobile phone and had a hard time. (S113)"	14	Tool support must be provided.	"Vehicle support should be provided to students who do not have computers. (S113)"	24
	I didn't have a computer.	"Not having a computer negatively affected my exam performance. (S90)"	10	The system should be made more compatible with mobile devices.	"The online exam system should be more compatible with mobile devices. (S90)"	13

Table 7 Tools in the online assessment process.

Table 7 shows that a small number of pre-service teachers had difficulty in taking online exams with mobile devices and needed a computer. It was suggested to provide students with tool support and to make the system more compatible with mobile devices. Table 8 shows the explanations about academic honesty in the online assessment process.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Academic Dishonesty	The exam environment was suitable for cheating.	"There was an environment suitable for cheating on exams. (S123)"	46	The exam should be held with the camera open.	"Students must take the exams with their cameras turned on. (S123)"	25
	It was an unfair process for those who studied hard.	"I prepared well for the exams, but some of our friends cheated. (S104)"	29	Cheating and plagiarism should be checked with artificial intelligence.	"Cheating and plagiarism should be checked with support from artificial intelligence. (S104)"	22

Table 8 Academic honesty in the online assessment process.

(Contd.)

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
	Homework was being done by artificial intelligence.	"There were students who did their homework with support from artificial intelligence platforms such as ChatGPT. (S50)"	11	Data sources for online assessment should be varied.	"The tools used to evaluate students should be enhanced. (S50)"	21
				Personalized exams should be conducted with question banks.	"Question banks can be created, and students can be given exams consisting of different questions. (S55)"	16
				Instructor control should be stronger.	"Instructor control should be increased. (S67)"	15
				Students' movements on the screen should be monitored.	"Instructors should be able to monitor students' activities on the exam screen. (S83)"	10
				Exams should measure higher-order thinking.	"Online exams should be able to measure higher-order thinking skills. (S15)"	10

The pre-service teachers stated that the online assessment process is very convenient for cheating and that this causes injustice. The pre-service teachers suggested that open-camera exams should be held, cheating and plagiarism should be checked with artificial intelligence, online assessment types should be varied, and personalized exams should be held. Table 9 shows the evaluations regarding time in the online assessment process.

Table 9 Time in the online assessment process.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Time	The time given for the exams was insufficient.	"The time given for the exams was not enough. (S9)"	41	Exam times should be determined in accordance with the course content.	"The duration of online exams should be appropriate to the scope of the course. (S9)"	44
	I couldn't finish online assignments and presentations on time.	"I couldn't submit some assignments on time. (S28)"	22	Information about the content should be given before the exam.	"Instructors should give detailed information about the exam. (S28)"	29
	I could not complete the exam on time due to technical problems in the system.	"Technical problems caused me to lose time. (S12)"	6	Questions should be understandable.	"Instructors should prepare the questions in a more understandable way. (S12)"	19
				Online platforms that work faster and more flexible should be used.	"Online exam platforms should be flexible and fast. (S12)"	11

It was observed that pre-service teachers did not find the time given to them in online exams sufficient and they had problems in completing online assignments and presentations. It was suggested that the exam duration should be compatible with the course content and detailed information should be given before the exams. Table 10 shows the explanations about the online assessment environment.

Table 10 Online assessment environment.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Environment	The home environment is noisy, and it negatively affected my exam performance.	"The home environment was noisy. (S78)"	21	Schools should create a suitable exam environment for students.	"Institutions should prepare a suitable environment for students who will take online exams. (S78)"	21

As shown in Table 10, it was observed that the home environment was not suitable for some pre-service teachers in terms of online assessment. It was suggested that schools should take measures for students who do not have a suitable environment. Table 11 shows the problems and suggestions for feedback in online assessment.

Table 11 Feedback in online assessment.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Feedback	I didn't get feedback from some instructors.	"I could not get answers to my questions about exams in some courses. (S84)"	32	An artificial intelligence-supported rapid support system should be developed.	"Schools can develop a rapid support system using artificial intelligence. (S84)"	61
	Our instructors were giving late feedback.	"Our instructors often responded late to my questions about exams. (S29)"	31	Online counseling hours should be planned before the exam.	"Instructors should conduct online counseling activities for exams. (S29)"	31
	There was no environment where we could easily ask our questions.	"I couldn't find an environment where I could ask my questions comfortably. (S4)"	26	The instructor should be easily accessible and provide prompt support.	"Instructors should be easily accessible to students. (S4)"	25
	Academic support and guidance were not sufficient.	"I do not think we received sufficient academic and technical support during the exam process. (S40)"	26	Instructions and training videos should be prepared for technical problems.	"Training videos on conducting online exams can be prepared. (S40)"	19
	I could not get support regarding the technical problems I experienced during the exam.		25	An online proctoring system should be used.	"Online proctoring can be used to provide quick support to students. (S57)"	10

As shown in Table 11, pre-service teachers have problems such as not getting regular feedback regarding online evaluation and not having a comfortable environment to ask questions. The pre-service teachers suggested that a quick support system supported by artificial intelligence should be established, online counseling hours should be organized, and instructors should be accessible. Table 12 shows the evaluations regarding instructor competence in the online assessment process.

Table 12 Instructor competency in online assessment.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Instructor Competency	Instructors were inexperienced in online assessment.	"Our instructors were not experienced in online assessments. (S94)"	31	Instructors should be given in-service training.	"Instructors can be given in-service training on online assessments. (S94)"	26
				Instructors should use online tools more actively.	"Instructors should actively use online assessment tools. (S94)"	15

As seen in Table 12, pre-service teachers think that instructors are insufficient in terms of online assessment. It was suggested that instructors should receive in-service training and use online assessment tools more actively. Table 13 shows the evaluations regarding the online assessment software.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Software	There were repetitive questions and options in the system.	"Some exams had repetitive questions. (S15)"	13	The system should not allow repetitive questions and options.	"Fast and flexible online assessment software should be used. (S15)"	25
	The system was working very slowly.	"The assessment system was slow, and I experienced freezes. (S102)"	10	More reliable and easy-to-use software should be used.	"Reliable and uncomplicated assessment software should be used. (S102)"	12
	We could not return to the question left blank.	"I couldn't go back to the question I left blank in the exam. (S93)"	10	Faster and more flexible software should be used.	"The online assessment software used by instructors should be fast and flexible. (S93)"	8
	The system was inadequate to prevent cheating.	"The online exam system failed to prevent cheating. (S40)"	10			

Table 13 Online assessment software.

The pre-service teachers stated that the online assessment software contains repetitive questions, works slowly, and does not prevent cheating. It was suggested to use a fast, reliable, and flexible system. Table 14 shows the evaluations regarding the comprehensiveness of the online assessment.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Comprehensiveness	Some exams included topics that were not covered in lessons.	"Some exams had questions about topics not covered in class. (S15)"	25	The number of activities and content in online courses should be increased.	"The diversity of online content should be increased. (S15)"	25
				Exam content should be limited to the topics covered in the course.	"Online exams should be related to the topics covered in the course. (S15)"	20

Table 14 Comprehensiveness of online assessment.

Pre-service teachers stated that some of the exams contained questions from subjects that were not covered in the online courses. In response to this, it was suggested to vary the activities in online courses and not go beyond the topics covered in the course in online exams. Table 15 shows the explanations for the practical lessons in the online assessment process.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Practical Course	The online exam was not suitable for laboratory courses.	"Online assessment is not suitable for practical courses. (S70)"	15	Students should be asked to conduct video-recorded experiments.	"Students can record their experiments with a camera. (S70)"	13
	Theoretical and practical courses were assessed in the same way.	"Instructors evaluated theoretical and practical courses using similar methods. (S65)"	12	Assessment tools should be varied.	"Different evaluation tools should be used for practical courses. (S65)"	10
				Simulation software should be used.	"Simulation software can be used in practical-oriented courses. (S23)"	8
				Practical exams must be done face-to-face.	"Practical courses should be evaluated in a face-to-face environment. (S23)"	6

Table 15 Practical courses in online assessment.

Some pre-service teachers did not find it appropriate to evaluate the practical courses online. In addition, it was observed that theoretical and practical courses were evaluated using the same method. The pre-service teachers suggested the use of video recordings in practical exams and the diversification of assessment tools. Table 16 shows the explanations related to online assessment anxiety.

Table 16 Online assessment anxiety.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Anxiety	I was afraid of experiencing technical problems.	"I was worried about experiencing disconnection during the exam. (S12)"	40	Instructors should hold meetings with students before the online exam.	"Instructors should hold online meetings with students before the exam. (S12)"	40
	I was afraid of not being able to complete the exam in the given time.	"I was afraid of not being able to complete the online exams on time. (S23)"	28	Sufficient time should be given for online exams.	"Instructors should be careful when determining the duration of online exams. (S23)"	25
	The inefficiency of online classes caused a fear of failure.	"The inefficiency of online classes was concerning. (S55)"	10	Assessment should be spread throughout the process.	"Expanding online assessment throughout the process may reduce concerns. (S55)"	18
	Inexperience with online exams was a cause for concern.	"I wasn't very experienced with online exams. (S40)"	10	Make-up exams should be given to students who have technical problems.	"Make-up exams should be held for students who have problems in the exams. (S40)"	13
				We should experience the online exam before the actual exam.	"Instructors can reduce test anxiety by taking online quizzes outside of the exam. (S40)"	10

Pre-service teachers were afraid of having technical problems and not being able to complete the exam. In addition, inefficient online courses and inexperience caused students to worry about failure. The pre-service teachers made suggestions such as holding online meetings before the exam, giving enough time in the exams and spreading the evaluation over the process. Table 17 shows the evaluations regarding the lack of information in the online assessment process.

Table 17 Lack of informative in online assessment.

FACTORS	PROBLEMS	STATEMENTS	F	SUGGESTIONS	STATEMENTS	F
Lack of informative	Information about the exams was not sufficient.	"Instructors did not provide sufficient information during the online exam process. (S3)"	56	Detailed information about the exam content should be given.	"Instructors should inform students about the exam process. (S3)"	45
	I didn't get answers to my questions.	"When I asked the teachers questions about the exams, I did not get an answer. (S87)"	10	Detailed instructions should be prepared for the exam for each course.	"An exam application guide should be prepared. (S87)"	25
				The instructor must be accessible.	"Instructors should be easily accessible to students. (S87)"	20

It was observed that pre-service teachers were not sufficiently informed about the online assessment process and could not find answers to their questions about the exams. In order to address these problems, it was suggested to provide detailed information about the exams and to prepare instructions.

DISCUSSION

This study examined the problems and solution suggestions of pre-service teachers regarding the online assessment process that they actively experienced. The pre-service teachers gave their suggestions regarding the online assessment process within the framework of the practices

and knowledge they experienced in the open and distance learning course. The instructors actively used result-oriented online tests, open-ended exams, and homework assignments to evaluate the performance of pre-service teachers. In a process in which summative assessment was actively used, pre-service teachers had problems such as the limited type of online exams used, evaluation based on a single criterion, and not having the opportunity to complete their deficiencies. In addition to online exams, pre-service teachers suggested personalized process-oriented assessment with artificial intelligence. Yıldırım and Tekel (2023) reached similar results in a phenomenological study examining the online assessment experiences of pre-service teachers. Pre-service teachers think that it is a problem for the instructor to evaluate a large number of students and that students cannot be followed up individually. Utilizing peer assessment and self-assessment can reduce the instructor's burden and make assessments more effective (Akcay et al., 2021).

The slow internet connection and interruptions caused some of the pre-service teachers to lose time during the exams. The importance of strong internet infrastructure, mobile internet, and asynchronous systems that can continue for a while when the internet is cut off was emphasized. A relatively small number of students had problems viewing and answering the exam questions because they did not own a computer and accessed the system via mobile phone. In order to participate in an online assessment, certain technological tools were required (Pu & Xu, 2021). Cheating and unfair assessment emerged as common problems in the online assessment process. It has been suggested to conduct exams with the camera on, to use artificial intelligence-supported software to prevent cheating and plagiarism, to vary online assessment tools, and to use adaptable online exams (Surahman & Wang, 2022). Pre-service teachers had problems keeping up with the time for online exams. Instructors kept the time short in some exams to prevent cheating, which resulted in students not being able to complete the exam. Instructors are expected to determine the content of online exams appropriately. Failure to meet the deadline for online exams is one of the problems encountered (Lee et al., 2022). It is understood from the statements of some pre-service teachers that their performance was negatively affected because they had motivational problems due to the home environment. Harley et al. (2021) stated that the home environment can affect students' emotional states. At this point, the importance of families being conscious and supportive has emerged. Since pre-service teachers had problems receiving feedback, suggestions such as the development of quick support software supported by artificial intelligence, online counseling, and accessibility of instructors attracted attention. The necessity and importance of instructors giving quick feedback to students are emphasized in different studies (Nguyen, 2023).

A significant number of pre-service teachers indicated that they lacked experience in online assessment and needed in-service training. The online assessment competence of instructors is critical for achieving learning goals (Mohamadi Zenouzagh, 2019). A few pre-service teachers criticized the usability of the online assessment software. The online assessment software does not allow returning to the previous question to avoid cheating. There were sometimes problems such as delayed display of questions due to system overload, freezing of the screen, and repeated options as a result of instructor inattention. The pre-service teachers who were negatively affected by such situations suggested the use of faster and more flexible software. Thathsarani et al. (2023) drew attention to the use of up-to-date and useful software in online assessments. Some instructors asked questions in online exams about topics that they did not cover in the course, and the performance of pre-service teachers was negatively affected. For pre-service teachers, it is important that the scope of the online exam is limited to what is covered in class (Ndlovu et al., 2023). Relatively few pre-service teachers did not approve of online assessments of practical courses (Yıldırım & Tekel, 2023). Suggestions were made for videotaped experiments, diversification of assessment tools, and face-to-face assessment in practical courses. Concerns about having technical problems in online exams and not being able to complete the exam in the given time came to the fore. In addition, pre-service teachers were not given enough information about the online assessment process. The importance of academic support and the time factor in reducing the anxiety of pre-service teachers was emphasized (Ndlovu et al., 2023). The suggestions of pre-service teachers are also in the direction of reducing anxiety and increasing the informative activities of instructors in online assessment.

CONCLUSION

The pre-service teachers encountered different problems in terms of online assessment factors. Pre-service teachers oppose only result-oriented evaluation and think that the learning process is ignored. It is suggested that formative assessment should be used in addition to summative assessment, and online assessment tools should be varied. Online tests and assignments are frequently used as types of evaluation, but pre-service teachers emphasized the need for different types of evaluations depending on the structure of the course. In the formative assessment process, gamification-supported online quizzes, learning analytics, peer assessment, and self-assessment can be used. The fact that online exams require an internet connection created technical limitations, and some students experienced problems. Policymakers and institutions need to facilitate students' access to the internet and take precautions accordingly.

Considering that students who do not have computers take online exams with mobile devices, the system must be made mobile-compatible. Cheating and plagiarism are common problems in online exams. Instructors can utilize technological opportunities such as artificial intelligence and plagiarism-checking software to ensure academic integrity in online assessments. Determining the duration of the online assessment more in line with the exam content can contribute positively to reducing students' anxiety and increasing their performance. Pre-service teachers complain about not being able to get quick feedback from instructors. Instant feedback, the availability of instructors, technical support, and support from families are important in reducing student test anxiety. Artificial intelligence-supported chatbot-like systems can be used for rapid feedback in providing academic and technical support to students. In addition, the software used in online assessment must work quickly and flexibly. Quick Support Software can be used to provide academic and technical support to students. It is among the expectations of pre-service teachers that instructors should improve themselves in online assessment and be transparent and supportive while evaluating students. Online evaluation of practical courses, in particular, has been seen as a problem, and alternatives such as diversifying evaluation tools, using three-dimensional environments and holding face-to-face exams have been suggested. In addition, pre-service teachers would like to learn more about the online exam process.

Unlike previous studies, this research was conducted with pre-service teachers who have experienced online assessment for a long time and have taken the foundations of open and distance learning courses. In this direction, researchers can develop applications within the framework of pre-service teachers' suggestions for online assessment and examine their effects. In addition, the evaluations of pre-service teachers from different nations and cultures with different online experiences can be investigated. It has been observed that online assessment research has intensified during the COVID-19 pandemic period, and in this context, the opinions of students who are currently participating in the online learning process can be taken. This research is a phenomenological study in which qualitative data were collected. For generalizable results in future research, mixed-method studies supported by quantitative data can be conducted. Other universities may use different online assessment methods in the online teaching process. In this regard, data can be collected and evaluated from students with different experiences.

DATA ACCESSIBILITY STATEMENT

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

ETHICS AND CONSENT

Ethical rules were followed in this research. Participants were given detailed information about the research process and the purpose of using the data. No identification information was requested from the participants.

COMPETING INTERESTS

The author has no competing interests to declare.

AUTHOR CONTRIBUTIONS (CRediT)

Mücahit ÖZTÜRK: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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