

Online Assessment in Turkish Universities: Challenges, Strategies, and Self-Efficacy Dynamics

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Abstract

The study aims to assess online assessment practices in a public university, addressing questions about self-efficacy levels, tools used, challenges faced, and proposed solutions. The chosen methodology employs a cross-sectional survey design, collecting both quantitative and qualitative data from 50 instructors in Türkiye through a convenience sampling method. Results indicate a moderate level of self-efficacy among participants, with challenges identified in monitoring student progress objectively and incorporating alternative assessment techniques. The study highlights a preference for summative assessments, particularly assignments, projects, and quizzes. Discussions and e-portfolios are less favored. The instructors addressing challenges in online assessment employ various precautions across assessment tools, processes, assessors, and the Learning Management System (Canvas). The strategies include enhancing question quality, favoring higher-order thinking skills, utilizing diverse assessment tools, and implementing precautions like item banks. During the assessment process, precautions involve considerations for exam duration, informing students, and encouraging professional development. In the Learning Management System, instructors rearrange options, enforce single answers, and seek assistance for technical challenges. To ensure internal validity, teachers have opted for measures to prepare questions according to lesson achievements, improve communication with students, and use different measurement tools. Findings resonate with the Technological Pedagogical Content Knowledge (TPACK) model, showcasing the integration of technological, pedagogical, and content knowledge to enhance online assessments' reliability and validity. The findings suggest a need for professional development to enhance instructors' competencies in addressing challenges and promoting a more balanced use of assessment methods in online education.

Keywords: *Higher education, instructors, online assessment competencies, TPACK*

Introduction

In the 21st century, higher education institutions have gained more importance, and determining the learning outcomes of students has become even more important for students' development (Amelung et al., 2011; Gikandi et al., 2011; JISC, 2010). Various assessment and evaluation methods have been developed for these purposes. Multiple-choice questions, open-response tests, and performance tasks are some of these methods. With the introduction of computer and internet

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technologies into university classrooms, assessment and evaluation approaches have also changed. These technological advances have led to a transformational change in assessment practice. These technological developments have brought a breath of fresh air to assessment and evaluation practices, leading to the emergence of online assessment or e-assessment approaches (Dunn et al., 2003; Odularu et al., 2022).

The advent of digital technologies has ushered in a transformative era for educational measurement and assessment, with online measurement emerging as a pivotal methodology. Defined by Jordan (2013) as the application of internet technology at any stage of the measurement-assessment process, online measurement encompasses a wide array of practices, from administering final exams through digital platforms to evaluating performance tasks in virtual environments. The integration of computers and, subsequently, internet technologies into educational settings has catalyzed a significant body of research dedicated to enhancing and evaluating online assessment practices (Bennet, 2006; Ridgway & McCuster, 2003; Shermis et al., 2006).

In the dynamic landscape of online education, the implementation of best practices in online measurement is paramount for ensuring the effectiveness, reliability, and fairness of assessments. A robust technological infrastructure is foundational, exemplified by the adoption of cloud-based platforms such as Google Classroom or Canvas, which guarantee scalable and uninterrupted access to assessments (Gaytan & McEwen, 2007). The pedagogical alignment of assessment methods with learning objectives ensures that assessments accurately reflect students' knowledge and skills (Reeves, 2000; Rovai, 2000). This can be achieved through diverse assessment formats, including adaptive quizzes for individual learning paths, peer assessments for evaluating collaborative skills, and interactive simulations for practical skill application (Kulkarni et al., 2013). Moreover, formative assessments through online forums and quizzes with instant feedback play a crucial role in providing continuous learning support. These practices, when effectively integrated, not only fortify the assessment process but also foster an inclusive and engaging educational environment, underscoring the importance of a holistic approach to online measurement that encompasses both technological and pedagogical considerations (Barbosa & Garcia, 2005; Gaytan & McEwen, 2007; Mosia & Matabane, 2022).

In the online education process, online assessment and evaluation methods have many advantages compared to paper and pencil tests. These benefits include cost and time efficiency, the ability to create automated tests, providing high-quality feedback, incorporating interactive elements and

multimedia tools into assessments, as well as facilitating personalized testing experiences (Boevé et al., 2015; Nikou & Economides, 2018; Rolim & Isaias, 2019; St-Onge et al., 2021; Whitelock & Watt, 2008). Studies in the literature indicate that online assessment provides faster and higher-quality feedback (Dermo, 2009; Hettiarachchi et al., 2013; Redecker et al., 2012). Doukas and Andreatos (2007) argue that online assessment allows for the immediate generation of results. This enables students to receive immediate feedback on their performance. When the role of timely and effective feedback in education is remembered, the level of contribution of online assessment applications to education is also revealed (Gikandi et al., 2011; Ras et al., 2015).

While electronic assessment (e-assessment) applications offer substantial advantages, it is crucial to recognize and address significant drawbacks. One notable drawback is the problematic reliability of tests. The literature underscores recurring issues related to the consistency and accuracy of test results, attributing these challenges to various factors, including the dynamic nature of technology, diverse student needs, and the complexity of accurately measuring learning outcomes electronically (Balta, 2014; Battal et al., 2022; Guerrero-Roldán et al., 2020; Hussein et al., 2020; Karahoca et al., 2021; Rovai, 2000; Solak et al., 2020; Tekin et al., 2022). Another critical drawback is insufficient technological literacy among teachers and students (Balta, 2014; Şenel & Şenel, 2021). Due to unfamiliarity with the technology, e-assessment tools may not be used effectively, and assessments may lack fairness and accuracy. Lack of access to technical infrastructure in universities also increases these concerns (Marriott & Teoh, 2019; Sari, 2020; Tekin et al., 2022). The inability of students and lecturers to access the necessary technologies and reliable internet connections may prevent the smooth implementation of e-assessment practices. In addition, this situation also raises problems related to inequality of opportunity in education (Battal et al., 2022; Tekin et al., 2022). Students who have difficulty accessing e-assessment technologies may naturally face obstacles to participating in this activity. Thus, the gaps in access to opportunities in education increase. This situation leads to the emergence of communication problems, which is another important disadvantage associated with online assessment practices (Meccawy et al., 2021). Lack of personal interaction between student and instructor can lead to communication problems, inhibit effective feedback, and potentially reduce the overall quality of the assessment process (Shuey, 2002).

Due to the limitations of online measurement, the proper integration of these technologies into education becomes more important and requires instructors to develop their skills in this regard.

Although traditional technological teaching tools such as smart boards and PowerPoint are familiar to instructors, their practical application in teaching still remains important. Instructors should gain competence in using information and communication technologies (ICT) in both teaching and assessment practices (Akram et al., 2021).

While some traditional face-to-face classroom skills transfer adequately to the online environment, additional competencies are required for instructors to be successful in the online environment (Martin et al., 2019). These additional competencies include the ability to effectively use online learning platforms, facilitate online discussions, provide meaningful feedback in virtual environments, and design assessments that are aligned with online learning objectives and the unique characteristics of the online environment (Gaytan & McEwen, 2007). Instructors need to have a strong understanding of instructional and assessment strategies that work best in the online learning environment (Gaytan & McEwen, 2007; Fein & Logan, 2003). They should be able to design assessments that accurately measure student learning and evaluate their mastery of course content. Furthermore, instructors should have the ability to adapt assessment formats to suit the different needs and preferences of online learners (Leary et al., 2020). Additionally, instructors need to possess the skills to create authentic and relevant assessments that promote critical thinking and problem-solving skills (Gaytan & McEwen, 2007; McGee et al., 2017). These competencies can be acquired through professional development and training specifically focused on online teaching and assessment. Furthermore, instructors should be knowledgeable in leveraging technology tools for assessment purposes, such as using learning management systems for administering quizzes and exams, utilizing online collaboration tools for group projects and peer evaluations, and incorporating multimedia elements for interactive and engaging assessments (Martin et al., 2019). Instructors must stay updated on emerging trends and best practices in online assessment to ensure they are providing quality feedback and evaluating student learning effectively (Gaytan & McEwen, 2007; Rovai, 2000). In summary, instructors in the online environment need competencies in using online learning platforms, facilitating discussions, providing feedback, designing assessments aligned with learning objectives and the online environment, adapting assessment formats to meet diverse learner needs, creating authentic and relevant assessments, leveraging technology tools for assessment purposes, and staying updated on emerging trends in online assessment.

Especially considering the advantages and limitations of online assessment, it is of great importance for instructors to carefully select and appropriately design the tools they choose for assessment. Of course, to achieve this, instructors are expected to seamlessly integrate their technological, content, and pedagogical knowledge (Jaipal-Jamani et al., 2018; Uerz et al., 2018). In this context, the Technological Pedagogical Content Knowledge (TPACK) framework provides educators with practical guidelines to ensure this integration effectively (Çam & Koç, 2021; Georgina & Olson, 2008).

The TPACK framework developed by Mishra and Koehler (2006) undertakes an important task to identify competences for online assessment and evaluation practices. TPACK emphasizes the interaction of three core knowledge domains: technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK) (Koehler et al., 2014). Technological knowledge (TK) includes the comprehension and application of technological tools and applications. This includes being aware of the myriad of digital tools available for instruction, how technology can change the way students learn, and how it can facilitate the teaching process (Swallow & Olofson, 2017). Pedagogical knowledge (PC) includes the effective teaching methods and strategies used by educators. It includes understanding how students construct knowledge, acquire skills, and develop disciplined thinking processes (Swallow & Olofson, 2017). This knowledge domain guides educators in selecting appropriate instructional strategies, designing learning activities, and assessing student learning in ways that are conducive to educational goals. On the other hand, content knowledge (CK) is related to the understanding of subject content (Shmidt et al., 2009). This encompasses facts, concepts, theories, and principles that are essential to a particular discipline (Swallow & Olofson, 2017). For educators, possessing deep content knowledge is fundamental to explaining complex ideas clearly and facilitating learning. The intersection and interaction of these three knowledge domains constitute TPACK, which is the specific knowledge required for the seamless integration of technology into teaching practices (Vasadavan et al., 2019).

In the context of online assessment, TPACK becomes essential for educators as it guides the design and implementation of assessments aligned with learning objectives, facilitates effective technology utilization, and enables the provision of meaningful feedback to students (Çam & Koç, 2021). Research indicates that educators with robust TPACK can adeptly choose suitable assessment tools, analyze assessment data, and interpret results to enhance their teaching practices

(Akram et al., 2021). Moreover, they proficiently integrate technology into assessment processes, ensuring that assessments are not only engaging and accessible but also closely aligned with the intended learning goals.

Because of the COVID-19 pandemic, in 2020 and 2021, higher education activities in Türkiye underwent a transformative shift, compelling institutions to adopt mandatory online education. In addition to all these, after the great earthquake on February 6, 2023, the spring semester of 2023–2024 was compulsorily switched to online education (Elhaty & Elhadary, 2023). Throughout these periods, diverse technological solutions were employed across universities. While some institutions chose established learning management systems such as Moodle, Canvas, or Blackboard (e.g., Eskişehir Osmangazi University), others relied on video conferencing technologies like Zoom and Skype (e.g., Bartın University) to facilitate their educational endeavors (Karademir et al., 2020; Tosun, 2021). Regardless of the chosen technology, assessment and evaluation activities emerged as significant concerns, prompting concerted efforts to identify the most effective approaches.

When examining studies on the utilization and adoption of educational technologies by instructors in Türkiye, conflicting results have been obtained. Studies by Çelik (2011) and Çağıltay et al. (2007) indicated that instructors' techno-pedagogical practices were low. In a more recent qualitative study by Çam and Koç (2020), instructors expressed that their technology knowledge levels were low and their TPACK competencies were insufficient. Conversely, there are studies stating that instructors have moderate confidence in their techno-pedagogical content knowledge (Önal & Çakır, 2015), as well as studies suggesting a high level of competence (Kabaran & Aykaç, 2018; Şimşek et al., 2013). With the development of mandatory online education during the pandemic, instructors faced both technological and pedagogical challenges in transitioning from traditional to digital assessment practices (Capperucci & Salvadori, 2021; Forrester, 2020; Ghanbari & Nowroozi, 2021; Şenel & Şenel, 2021; Todd, 2020). Ghanbari and Nowroozi (2021) examined the challenges faced by Iranian EFL teachers during mandatory online education. The study's results indicated that challenges initially perceived as difficult by teachers gradually resolved, leading to a shift in their attitudes towards online assessment. Teachers overcame inhibiting attitudes and embraced the benefits of online assessment. The initial ambivalence was attributed to factors such as the teachers' lack of technological competence for online assessment. Şenel and Şenel (2021) conducted a study in which university students were asked to evaluate their

experiences with online assessment practices. Generally, university students expressed satisfaction with online assessment practices and complained about rapid assessment, ineffective feedback, and the low discriminatory level of test results. The underlying reasons for this were attributed to instructors' unfamiliarity with this new technological environment, i.e., their lack of technopedagogical skills and the excessive workload (Şenel & Şenel, 2021). When examining studies on instructors' competencies in online assessment methods, different results are observed. According to Balta (2014), instructors perceive themselves as competent in using online assessment methods. Additionally, instructors have been found to value formative assessment and providing students with information about the process regarding online assessment methods (Balta, 2014). On the other hand, Aydın et al. (2021) investigated instructors' assessment competencies during the pandemic and found that instructors did not feel competent in using appropriate assessment tools (surveys, online quizzes, Kahoot, etc.) and appropriate alternative assessment techniques (peer assessment, e-portfolio, etc.) to ensure the achievements of the course.

If online assessment methods are divided into formative and summative, instructors in Türkiye think that summative assessment methods are more effective (Yüksel & Gündüz, 2017). When specifically examining instructors' online assessment practices during the period of mandatory online education, it is observed that instructors predominantly favored the use of multiple-choice and open-ended item types (Aslan-Altan & Karalar, 2022; Battal et al., 2022). In addition to these, alternative assessment tools such as performance tasks, online presentations, and projects were also implemented (Aslan et al., 2022; Battal et al., 2022; Şenel & Şenel, 2021). However, there is a lack of research on the appropriateness of these assessment tools for different assessment types, the areas where instructors may have weaknesses in their competencies, and the aspects that need improvement. When examining the characteristics of instructors who received recognition during the online education process, it was determined that they conducted various assessments by considering student needs and utilizing both traditional and innovative assessment methods. Furthermore, these instructors use rubrics to assess students. Additionally, they provide timely responses and feedback on student performances, make themselves available when needed, and engage in periodic communication (Martin et al., 2019). Given these qualities, it is imperative to evaluate instructors, taking into account their diverse and effective online assessment practices during the period of mandatory online education.

Purpose of the Study

While existing studies point to challenges in the assessment and evaluation stages of online learning experiences in Türkiye, this study aims to contribute by assessing the situation of online assessment practices in a public university. Our objectives are to identify problems encountered and propose solutions, addressing the following research questions:

1. What are the self-efficacy levels of instructors regarding online assessment and evaluation?
2. What are the online assessment methods and tools used by instructors in online education?
3. What problems do instructors face in online assessment?
4. What are the solution suggestions of instructors for the problems they encounter in online assessment?

Method**Research Design**

The study aims to explore online education instructors' assessment and evaluation competencies. Utilizing a survey research method, the study collects both quantitative and qualitative data (Creswell, 2012). Surveys are efficient for diverse participant data collection, making them suitable for societal trends or phenomena with varied perspectives. The chosen survey model aligns with the cross-sectional research approach, collecting data at a single time point. In the study, online education instructors' assessment and evaluation competencies are selected as a variable to investigate.

Context of the Study

The study was conducted at a Turkish public university in the Central Anatolia region during the spring and summer semesters of 2022–2023. Despite the subsiding COVID-19 pandemic, an earthquake in Kahramanmaraş led to a transition to emergency online education in all departments except applied ones like medicine and dentistry. While hybrid education was introduced in April, the Higher Education Institution's decision kept exams remote. The university utilized Canvas as its learning management system, allowing flexibility in employing various online assessment tools alongside Canvas for midterm and final exams with no imposed restrictions.

Participants

In this study, the selection of participants was guided by a convenience sampling strategy, a method chosen for its practicality and efficiency in accessing a readily available subset of the target population. While acknowledging the limitations inherent to this approach, particularly in terms of generalizability (Cohen & Manion, 1998, as cited by Büyüköztürk et al., 2023), the sampling process was designed with specific criteria in mind to ensure the collection of informative and relevant data.

Participants were identified and selected based on their active engagement in online teaching at a public university located in the Central Anatolia region of Türkiye. This criterion was paramount to ensuring that the insights gathered were grounded in firsthand experience with online assessment practices. The sampling aimed to encompass a broad spectrum of disciplines and faculties, reflecting the university's diverse academic landscape. This diversity was essential for exploring the multifaceted challenges and strategies associated with online assessment across different academic contexts.

To further refine the sampling process, invitations were extended to all university lecturers, resulting in the voluntary participation of 50 instructors. This sample size was deemed sufficient for capturing a wide range of perspectives while remaining manageable for in-depth analysis. The representativeness of the sample was enhanced by the demographic diversity of the participants, including a balanced gender distribution and a wide range of teaching experience. This demographic spread was crucial for examining the potential variability in online assessment competencies and challenges across different stages of academic careers.

Furthermore, the study's sampling methodology sought to capture variations in instructors' previous training in assessment and evaluation, both in general and specifically in an online context. This aspect was critical for understanding the baseline competencies and identifying gaps in knowledge and skills pertinent to online assessment practices. The demographic characteristics of participants are elucidated in Table 1.

Table 1*Demographic Characteristics of Participants*

Variables	Categories	n	%
Gender	Female	28	56
	Male	22	44
Faculty or School	Faculty of Education	13	27.7
	Faculty of Engineering and Architecture	5	10.6
	Faculty of Agriculture	4	8.5
	Faculty of Economics and Administrative Sciences	4	8.5
	Vocational School of Foreign Languages	4	8.5
	Faculty of Art and Design	3	6.4
	Faculty of Science	3	6.4
	Faculty of Health Sciences	3	6.4
	Faculty of Tourism	2	4.3
	Faculty of Humanities and Social Sciences	2	4.3
	Vocational School of Health Services	2	4.3
	Faculty of Theology	2	4.3
Period of active teaching	1-3 years	7	14.0
	3-5 years	5	10.0
	5-7 years	7	14.0
	7-9 years	4	8.0
	9 and above	27	54.0
Existence of previous assessment and evaluation training	Yes	32	64.0
	No	18	36.0
Existence of previous online assessment and evaluation training	Yes	6	12.0
	No	44	88.0

As indicated in Table 1, approximately 56% of the participants were female lecturers. The faculties or vocational schools from which the lecturers were drawn exhibited considerable diversity, with the highest participation observed from the Faculty of Education (27.7%) and the lowest from the faculties of Theology, Humanities, and Social Sciences (4.3%). When participants were questioned

about their prior training in measurement and evaluation, 64% confirmed having received training in this field. However, only 12% reported having received training in online measurement and evaluation.

Data Collection Tools

The research utilized a comprehensive data collection approach, incorporating three key components. The first segment focused on gathering demographic information, including participants' workplace, gender, professional experience duration, and whether they received assessment and evaluation training. For quantitative data, the study employed the "Online Assessment and Evaluation Competency Scale for Lecturers," a 25-item Likert-type scale developed by Koç, Uzun, and Coral in 2022. The scale has two dimensions: competencies (13 items) and deficiencies (12 items). As the 12 items in the deficiency dimension were presented in a negative format, they were reverse-coded to compute the total score. Participants were requested to place these items on a scale, rating them from 0 to 100 with intervals of 10 points. The scale demonstrated high reliability, with a Cronbach's alpha coefficient of 0.96 (Koç et al., 2022). The qualitative component involved a questionnaire exploring participants' online assessment experiences, utilized platforms, challenges faced, and potential solutions. Data collection employed Google Forms, distributed via email to lecturers.

Data Analysis

The research data were analyzed in two stages: quantitative and qualitative. While quantitative data were used to seek answers to the first and second research problems, the third and fourth research problems were revealed with the help of qualitative data. In the quantitative facet, the scale data underwent descriptive statistical analysis using the Jamovi 2.2.5 program, involving arithmetic mean, standard deviation, frequency, and percentage calculations. Jamovi, an open-source statistical software, supports a broad spectrum of statistical analyses, spanning from fundamental descriptive statistics to inferential analyses.

The qualitative data analysis within this study adhered to a systematic and rigorous thematic analysis process, as delineated by Braun and Clarke (2006). This process commenced with a meticulous reading of the collected responses to gain a deep understanding of the data's breadth and depth. Following this initial engagement, the data was subjected to a coding process, where

initial codes were generated by identifying meaningful patterns and insights related to the study's 3rd and 4th research questions. Each code was carefully annotated with corresponding data excerpts, ensuring a robust and traceable linkage between the data and its interpretation. Subsequently, the identified codes were aggregated into potential themes, with each theme representing a significant pattern across the data set that related to the research questions (Creswell, 2012). This thematic framework was then reviewed and refined, ensuring each theme's coherence and distinctiveness and that the overall narrative captured by the thematic analysis was reflective of the data as a whole.

Reliability and Validity

To assess the scale's reliability and its sub-dimensions, Cronbach's Alpha and McDonald's Omega, recommended for multidimensional structures (Hayes & Coutts, 2020), were employed. The omega coefficient for the competence sub-dimension was 0.97 (Cronbach alpha was 0.96), and for the deficiencies sub-dimension, it was 0.943 (Cronbach alpha was 0.931). The overall scale exhibited high reliability, with an omega coefficient of 0.940, aligning with Kline's (2016) definition of reliability coefficients of 0.90 and above as excellent values, affirming the robustness of the results. The Cronbach Alpha was calculated as 0.924 for the whole scale.

The qualitative data questionnaire underwent rigorous review by two measurement and evaluation experts and two instructors from distance education centers, with adjustments made based on their expert opinions. A pilot study involving lecturers from three departments ensured question clarity and page layout functionality. In the post-pilot study, inconsistencies in the measurement tool were addressed, some questions were revised, and additional sections were introduced for open-ended responses. Every step in qualitative data analysis was meticulously documented, and for data triangulation, questionnaire responses and scale items from lecturers were jointly evaluated.

Ethical Considerations

The study received ethical approval from a state university, ensuring voluntary participation with the right to withdraw. Participants' identities were protected, and data collected via Google Forms was securely stored and not shared beyond the research team.

Findings

Findings of the Online Assessment and Evaluation Competency Scale

The study employed a scale to assess instructors' self-efficacy in online assessment and evaluation. The mean and standard deviation values for the scale and its sub-dimensions are presented in Table 2.

Table 2

Descriptives of Online Assessment and Competency Scale Results

Variables	Aritmetic Mean	Standart Deviation	Minimum	Maximum
Competencies subscale	64.88	22.83	0	100
Deficiencies subscale	33.3	20.3	0	100
Whole scale	65.76	16.62	0	100

The arithmetic mean for the competencies sub-dimension scores of participating lecturers is 64.88 (std. deviation 22.83), indicating a moderate level of self-efficacy. In the deficiencies sub-dimension, with negative expressions, the mean is 33.3 (std. deviation 20.3), suggesting low perceived deficiencies. Overall scale scores, obtained by reverse coding deficiencies, have an arithmetic mean of 65.76 (std. deviation 16.62), indicating a moderate level of self-efficacy in online assessment and evaluation for the participants.

Upon analysing individual responses to scale items, the lowest score ($\bar{X}=58.60$) pertained to "(Item 12) I can monitor student progress objectively with online assessment and evaluation applications" and "I can develop activities for questioning cognitive skills in online assessment and evaluation" received a score of $\bar{X}=61.40$. Conversely, the highest scores were observed in the items "I have difficulty in determining at which stage I will include assessment and evaluation activities in the online teaching process" ($\bar{X} = 23.8$ when reverse coded 76.2) and "I can transfer the assessment and evaluation activities I have developed to online environments" ($\bar{X} = 73.4$). Furthermore, "I have difficulty in including alternative assessment and evaluation techniques (project, portfolio, performance, etc.) in online teaching" received a score of 73.0. The analysis indicates that while participants feel competent in conducting measurement and evaluation activities online, they face challenges in establishing an objective structure for monitoring student progress and developing activities targeting high-level cognitive skills.

Findings on Lecturers' Online Assessment and Evaluation Practices

The study aims to uncover lecturers' assessment practices, exploring types, frequency, preferred items, and tools in online education. The initial focus is on the frequency of using process and summative assessments, as detailed in Table 3.

Table 3

Instructors' Frequency of Using Formative and Summative Assessment in Online Education

Assessment types	Never n (%)	Rarely n (%)	Frequently n (%)	Always n (%)
Formative Assessment	2 (%4)	8 (%16)	30 (%60)	10 (%20)
Summative Assessment	0 (%0)	2 (%4)	14 (%28)	34 (%68)

Analyzing Table 3 data reveals lecturers predominantly favor and frequently use summative assessments. Notably, 20% consistently use formative assessments, contrasting with 68% consistently utilizing summative assessments. This aligns with findings from item 12 of the self-efficacy scale for online assessment and evaluation.

Additionally, participating lecturers were queried on the frequency of utilizing quizzes, homework, discussions, and electronic portfolio applications, with summarized results presented in Table 4.

Table 4

The Frequency of Instructors' Use of Some Online Assessment and Evaluation Practices

Assessment types	Never n (%)	Rarely n (%)	Frequently n (%)	Always n (%)
Quiz	8 (%16)	13 (%26)	20 (%40)	9 (%18)
Homework/Project	0 (%0)	7 (%14)	26 (%52)	17 (%34)
Discussion	7 (%14)	15 (%30)	19 (%38)	9 (%18)
e-portfolio	23(%46)	18 (%36)	6 (%12)	3 (%6)

According to Table 4, assignments or projects are the most frequently used assessment methods in online education, followed by quizzes. About 40% of participating lecturers commonly employ quizzes to assess student knowledge and skills. Discussions are used frequently by 38% of the participants, while e-portfolios are the least preferred. These preferences align with the overall low

utilization of formative assessment. The study indicates that lecturers tend to assign homework or projects during online education, and online exams, though less preferred, are inevitable in some cases. The item types preferred in online exams on the CANVAS system are detailed in Table 5.

Table 5

Frequency Levels of the Types of Items Used by Instructors in Online Exams

Item types	Never n (%)	Rarely n (%)	Frequently n (%)	Always n (%)
Multiple choice	7 (%14)	4 (%8)	19 (%38)	20 (%40)
True-false	12 (%24)	18 (%36)	12 (%24)	8 (%16)
Fill in the blank	16 (%32)	16 (%32)	9 (%18)	9 (%18)
Multiple fill in the blank	23 (%46)	16 (%32)	7 (%14)	4 (%8)
Multiple answers	27 (%54)	15 (%30)	4 (%8)	4 (%8)
Multi-drop-down menu	30 (%60)	11 (%22)	4 (%8)	5 (%10)
Matching	24 (%48)	13 (%26)	9 (%18)	4 (%8)
Numeric answer	30 (%60)	12 (%24)	8 (%16)	0 (%0)
Question on formula	38 (%76)	8 (%16)	4 (%8)	0 (%0)
Open-ended question	9 (%18)	5 (%10)	20 (%40)	16 (%32)
Question with file upload	18 (%36)	7 (%14)	12 (%24)	13 (%26)

In Table 5, the frequently used item types by participating lecturers include multiple-choice, open-ended, and file upload questions. Formula questions, multiple drop-down menus, and numerical answers are the least preferred and least frequently used item types in midterm and final exams.

Some participants express a preference for alternative assessment methods, such as projects and presentations, emphasizing a practical approach in courses (P1, P2, P15, P16, P20, and P30). For example, Participant 20 said, "Since I gave courses on practice at the undergraduate level, I mostly conducted online courses such as projects with file uploads and e-portfolios, and in graduate programs, I conducted online courses by giving assignments on presentations and article uploads." She emphasized alternative assessment and evaluation methods.

Additionally, concerns about the reliability of online exams were raised, with suspicions of cheating and plagiarism (P30, P36, P45, and P46). Some lecturers address this issue by opting for homework assignments, as mentioned by Participant 30, who highlighted the use of field research to assess students' understanding of course content.

The most commonly utilized online assessment method among participating lecturers was performance tasks. Subsequently, the study sought to investigate the specific types of performance tasks assigned within the limitations of the CANVAS Learning Management System, as presented in Table 6.

Table 6

Performance Tasks Preferred by Instructors in The Online Education Process

Performance types	Never n (%)	Rarely n (%)	Frequently n (%)	Always n (%)
Individual assignment	2 (%4)	10 (%20)	25 (%50)	13 (%26)
Group assignment	6 (%12)	19 (%38)	21 (%42)	4 (%8)
Peer assessment	24 (%48)	20 (%40)	5 (%10)	1 (%2)
Self-assessment	21 (%42)	16 (%32)	11 (%22)	2 (%4)
Moderated grading	34 (%68)	10 (%20)	5 (%10)	1 (%2)
Evaluation criteria (rubrics)	12 (%24)	13 (%26)	11 (%22)	14 (%28)

The lecturers predominantly assigned individual (50%) and group (42%) performance tasks during online education. The answers given to items 7 and 14 in the scale showed that the lecturers had a medium-high level of competence in the use of alternative assessment techniques. However, the use of assessment rubrics was varied, with half infrequently using them. At this point, it is seen that lecturers have a high tendency to give individual or group assignments, but the rate of rubric use required for a fair evaluation of these assignments is not very high. Peer and self-assessment, considered alternative methods, were seldom used. When the scores obtained from the 23rd item of the self-efficacy scale were analyzed, it was seen that the lecturers felt moderately competent in using peer assessment. Notably, 68% never employed moderated grading.

The participants (P1, P6, P19, P45, and P46) shared insights on enhancing performance tasks. Some highlighted frequent use of course-aligned homework (P1), while Participant 19 emphasized using online technologies for presentation assignments. Challenges in online performance tasks were acknowledged, with concerns about student understanding in remote education (P45) and difficulty in evaluating practical subjects online (P46). Another participant (P6) stressed the time-consuming nature of performance tasks and the importance of student preparation. The responses

collectively highlight varied approaches and challenges in optimizing performance tasks in the online learning environment.

The participants were surveyed on their preferred assessment methods for synchronous courses at the research-conducted university, including options allowed by the Bluepoint system linked to CANVAS for synchronous courses (see Table 7).

Table 7

Frequency Levels of the Assessment Types Used by the Instructors in Synchronous Classes

Assessment types in synchronous classes	Never n (%)	Rarely n (%)	Frequently n (%)	Always n (%)
Q & A	4 (%8)	3 (%6)	26 (%52)	17 (%34)
Survey	19 (%38)	21 (%42)	8 (%16)	2 (%4)
Group rooms	25 (%50)	12 (%24)	11(%22)	2 (%4)
Discussion in class	5 (%10)	11 (%22)	21 (%42)	13 (%26)
Peer assessment	26 (%52)	17 (%34)	5 (%10)	2 (%4)
Quizzes	14 (%28)	10 (%20)	21 (%42)	5 (%10)

Table 7 demonstrated that the lecturers commonly use oral Q&A and discussions. Less preferred are questionnaires, group rooms, and peer assessment. 42% frequently use quizzes during lectures. They were asked about other assessment and evaluation approaches they used during synchronous online courses. Two participants mentioned different methods (video analysis, research assignment) (P1, P6). Others (P23 and P42) highlighted challenges in teaching applied courses, expressing difficulties in successful assessment. For example, Participant 23 said, "It is very difficult to teach synchronous courses in the Visual Communication Design department, which is an applied department. For this reason, it is also difficult to realize the successful completion of the measurement and evaluation process." Their statements showed what they experienced in the lessons.

The lecturers, despite utilizing the CANVAS system, were surveyed about their preferences for Web 2.0 tools in online education. In this section, the participants had the opportunity to check the options more than once (see Table 8).

Table 8*Frequency Levels of the Web 2.0 Tools Used by the Lecturers for Assessment*

Web 2.0 tools	n	%
Google Docs	25	71.4
Google Forms	21	60.0
Kahoot	10	28.6
Quizizz	6	17.1
Wordwall	5	14.3
Mentimeter	3	8.6
Quizmaker	3	8.6
Socrative	2	5.7
Learning Apps	2	5.7
Blogger	2	5.7
Edpuzzle	2	5.7
Mindmeister	1	2.9
Padlet	1	2.9
Wooclap	0	0.0
Plipgrid	0	0.0
Others	6	17.1

Table 8 reveals the lecturers' preferences for online assessment and evaluation platforms beyond the learning management system. Google Documents and Google Forms are the most utilized Web 2.0 tools, followed by Kahoot. Conversely, Wooclap and FlipGrid are least favored. The chosen tools align with the lecturers' frequent use of online assignments. Google Docs facilitates easy assignment submission and feedback, while tools like Blogger and MindMeister, which support formative assessment, are less preferred for tracking student progress.

The participants employ Web 2.0 tools for diverse purposes. Some use them for file sharing (P20, P31), others for process evaluation (P5, P12, P15, P37), reinforcing classroom subjects (P9, P42, P44, P48), and assessing students' needs at the semester's outset (P2, P5). Participant 5, for instance, utilizes tools like Google Forms to gauge prior knowledge, track progress, and plan future activities. Some, like P11 and P35, use tools for concept map creation to understand students' associations with topics. Others, like P10, employ Kahoot and Mentimeter for motivation. Additionally, tools such as Google Docs aid in administrative processes (P15), while tracking assignments and providing feedback are facilitated by some (P19).

Findings on the Difficulties Experienced by Instructors Regarding Online Assessment and Evaluation

Despite the inevitability of assessment and evaluation in online education, participants encounter difficulties. The challenges they face are detailed in Table 9.

Table 9

Problems Encountered in The Online Assessment and Evaluation Process

Challenges and problems	n	%
Student participation is low	34	68
Lack of infrastructure (internet problems, insufficient servers)	28	56
Difficulty in preparing assessment and evaluation practices and activities	23	46
Students' lack of knowledge about the online system	22	44
Difficulty in conducting an evaluation	21	42
Time consuming	18	36
Inadequacy of the Learning Management System (Canvas)	12	24
Others	7	14
I do not experience any difficulties or problems	6	12
Complexity of the Learning Management System (Canvas)	3	6

The study discussed challenges faced by the lecturers in online assessment and evaluation, revealing issues such as low student participation and infrastructure deficiencies. Commonly cited problems included difficulty in preparing and conducting assessments (P23, P21), excessive time spent (P18), and students' lack of knowledge about the online system. The answers to the other option focused on exam security. The possibility of students cheating is one of the important problems experienced by the lecturers.

Some lecturers expressed concerns about students' lack of interest and motivation (P 1, P3, P21), while others (P8, P31, P39, P46) highlighted issues related to exam security, including plagiarism and the need for systemic measures. For example, participant 3 said, "Since students see passing the class in distance education as a pocket, no more than one or two people from each class contribute to the lesson and do not answer our questions. I don't know whether there are students or not." In his statements, he claimed that the communication problem he experienced was due to the lack of motivation of the students. On the other hand, Participant 31 drew attention to plagiarism and artificial intelligence issues and stated that systemic measures should be taken at this point. Difficulties with the learning management system (CANVAS) were also mentioned (P8

and P10), indicating problems arising from insufficient knowledge about the system's features and limitations.

Ensuring the reliability of online assessment results is a significant challenge. Despite some precautions taken at the institutional level, the lecturers found them insufficient, prompting them to implement additional precautions independently. The study explored the steps lecturers took to enhance reliability, employing descriptive analysis to identify codes and themes. Table 10 presents the codes derived from the participants' responses and the themes arising from similar codes.

Table 10

Practices and Precautions Taken to Increase the Reliability of Results

Themes	Codes	Participants
Precautions for the Assessment Tool	Types of questions and targeting higher-order thinking skills	P6, P11, P48, P39, and P30
	Self-control/Monitoring	P36, P7, P46, P44, P38, P37, P10, and P1
	Creating an item pool	P49, P43, P17, P8
	Obtaining expert opinions	P33, P43, P5, P1
	Use of explanations and instructions	P1
	Preparing a variety of assessment types	P18, P30
	Preparing questions	P14, P28
Precautions for the Assessment Process	Student evaluation	P44, P10
	Exam duration and control policies	P1, P4, P6, P26, P17, P12, and P2
	Informing students	P19, P42, P35, P4, P1
Precautions for the Assessor	Participation in events for professional development	P45
	Question-based Progress and Evaluation	P24
Precautions in the Learning Management System	Allowing single test entry	P39, P17, P12, P8
	Non-return questions	P8, P39, P2
	Getting help from others	P32, P41, P10
	Changing the order of the options	P6

The analysis of precautions addressing reliability issues in online assessment yielded four themes: precautions for the measurement tool, the measurement process, the person conducting the assessment (lecturer), and the online system. The participants focused on enhancing question quality, favoring multiple-choice questions to predict higher-order thinking skills, and using diverse measurement tools (discussion, presentation) to minimize errors. Establishing a question bank, peer consultation, and scrutiny by colleagues aim to ensure tool effectiveness. The lecturers reiterated meticulous question preparation, reducing errors during the process. Some adopted pre-tested questions to enhance reliability.

For the measurement process, codes like exam duration and control (P1, P4, P6, P26) and student information (P19) emerged. Participants aligned exam duration with question characteristics, while some clarified the process for students using files or links (P35). Precautions for the assessors included one participant mentioning training in online assessment.

Overall, the lecturers employed a multifaceted approach, combining effective question preparation, process clarity, and personal training to enhance the reliability of online assessment and evaluation.

Precautions for the online assessment system were categorized into codes such as "Changing the order of the options," "Access to single entry," "Non-return questions," and "Getting help from others." The participants aimed to thwart cheating by randomizing option orders and limiting students to a single entry. Some enforce question-locking strategies after answering to prevent revisiting. For instance, participant 8 mentioned practices like "making students see the questions only once." Technical problems were addressed by seeking assistance from experts, ensuring reliability in the face of challenges.

The participants were asked about validity, an essential aspect of assessment and evaluation. Their practices and precautions to align course outcomes with measurement tools were explored (see Table 11).

Table 11*Practices and Precautions Taken to Increase the Validity of the Results*

Themes	Sub-themes	Codes	Participants
Internal Validity	Test content evidence	Preparing questions in accordance with the course outcomes	P4, P5, P6, P8, P10, P14, P15, P17, P18, P24, P26, P28, P32, P36, P37, P42, P43, and P44
		Explaining course outcomes to students	P15, P43
		Following the program framework	P1
		Communicating and building relationships with students	P3, P15
	Consequences of testing evidence	Giving feedback to students	P22, P33, P46
	Using alternative assessment tools	Using a variety of assessment tools appropriate to the outcomes	P10, P12, P16, P18, P35, and P49
		Using peer assessment	P20, P46
		Using an extra assessment tool when there is a problem	P20

From the provided table, several key themes and sub-themes related to the participants' engagement in assessment practices can be identified. The main theme emerged as internal validity, and sub-themes are test content evidence, improving comprehension, consequences of testing evidence, and using alternative assessment tools. These findings highlight the multifaceted nature of assessment practices among the participants, encompassing various dimensions such as test content development, communication strategies, feedback provision, and the utilization of diverse assessment tools.

Lissitz and Samuels (2007) propose an enhanced validity theory, advocating for scrutiny of a test's internal and external aspects. Internal validity relies on reliability and content validity, while external validity is linked to criterion-related and construct validity. The study aligns with this perspective, focusing on test content, evidence, and reliability.

The participants emphasize test content alignment with learning objectives, demonstrating a commitment to content validity. For instance, Participant 1 articulates, "I create content within the framework set by the higher education institution and similarly follow this framework in the assessment process. I pay attention to content validity, especially." The focus includes following program frameworks and clarifying outcomes for students. Regarding reliability, the instructors employ diverse item types to enhance consistency. Some instructors aim to increase reliability and, consequently, validity by using different item types (multiple-choice, open-ended, and matching) together.

Notably, the emphasis is on internal validity measures, aligning with Lissitz and Samuels's (2007) framework, while external validity aspects, like criterion validity and construct validity, are not prominently addressed.

Discussion, Conclusion and Implications

In this study, the primary aim is to elucidate the online assessment and evaluation competencies of instructors at a state university in Türkiye. By gathering responses through scales and surveys, the research aims to comprehensively analyze the landscape of online assessment practices, uncover the challenges faced by instructors, and identify the solutions implemented in this context. This methodological approach ensures a nuanced exploration of instructors' experiences and perspectives, shedding light on prevalent online assessment applications and pedagogical strategies. This study is aimed at outlining current practices as well as providing suggestions that will be helpful for improving further developments of online methodology evaluation within academic discourse, formulating appropriate policies at the institutional level, and perhaps informing the professional development agenda in Turkish higher education.

The quantitative findings revealed moderate levels of self-efficacy among instructors in online assessment and evaluation, along with a preference for summative over formative assessments, as evidenced by the Online Assessment and Evaluation Competency Scale results. This was further corroborated by the prevalent use of traditional assessment types, such as quizzes and homework/projects, over innovative formats like e-portfolios and peer assessments. This moderation is influenced by diverse factors such as technical problems, pedagogical considerations, student-related issues, lack of time, complexities with Learning Management System, the need for balance, security concerns, alternative approaches, and professional

development aspects. Therefore, instructors continuously undertake self-learning to cope with this dynamic landscape that brings about fluctuations in their self-efficacy. The same findings are reflected in the research conducted by Öndal and Çakir (2015). However, some research suggests a low level of techno-pedagogical knowledge among Turkish instructors (Aydın et al., 2021; Çağıltay et al., 2017; Çam & Koç, 2020; Çelik, 2011). Aydın et al. (2021) particularly assert a lack of competence in both traditional and alternative online assessment methods, such as peer assessment and e-portfolios. Studies in other countries also show that instructors may not possess significant expertise in online assessment (Farhat et al., 2021; Haider et al., 2022). Institutional policies within the Turkish higher education system have been rapidly evolving to accommodate and regulate online education, especially in response to the COVID-19 pandemic. The Council of Higher Education (YÖK) has introduced guidelines to facilitate the transition to online learning, emphasizing the need for quality assurance and effective assessment methods. However, the moderate level of self-efficacy reported by instructors in our study suggests that policies may need to go further in providing specific guidelines and support for developing and implementing online assessments. Analyzing individual items on the scale reveals those instructors face challenges in establishing an objective structure for monitoring student progress and designing activities targeting high-level cognitive skills, aligning with other study outcomes. Notably, there is a prevalent inclination toward summative assessments over formative assessments, and most instructors either rarely or never implement e-portfolios, suggesting potential gaps in their perceived competence in fostering student development.

The preference for summative over formative assessments, as evidenced by the frequent use of quizzes and homework, signals a reliance on traditional assessment methods. This preference contrasts with contemporary educational theories advocating for the benefits of formative assessment in promoting continuous learning and student engagement (Harlen & James, 1997). The low utilization of formative assessments and innovative practices like peer assessment and e-portfolios suggests potential barriers to implementing more student-centered approaches in online education. Cultural dimensions play a significant role in shaping educational practices and attitudes towards online learning and assessment in Türkiye. The Turkish educational culture, characterized by a high-power distance (Hofstede, 1980), often translates into a more teacher-centered approach in the classroom, both online and offline. This cultural trait may influence instructors' preferences for summative assessments over formative ones, as observed in our

findings. In such contexts, the authority of the teacher is paramount, and assessment practices may lean towards methods that reinforce this traditional dynamic, such as quizzes and exams, rather than participatory or student-centered formative assessments.

According to the findings of the current study, lecturers in online education commonly rely on quizzes and assignments/projects. Examination of preferred question types in short quizzes reveals a predominant use of multiple-choice, true-false, and open-ended questions. Some instructors express reservations about the reliability of online exams, leading to the adoption of alternative assessment methods such as projects and presentations. Performance tasks, especially individual and group assignments, are frequently employed, but there is variability in the use of assessment rubrics. Peer and self-assessment are regarded as less preferred assessment methods. Similarly, in synchronous courses, lecturers commonly utilize oral Q&A and discussions, while questionnaires, group rooms, and peer assessment are less used. When these findings are collectively considered, the instructors tend to use traditional methods, such as quizzes prepared with multiple-choice or open-ended questions, while showing reluctance towards alternative methods like peer assessment, self-assessment, and e-portfolios. This aligns with some existing studies supporting these findings (Battal et al., 2022; Capperucci & Salvadori, 2021). For instance, Battal et al. (2022) state that university instructors in Türkiye frequently used homework, multiple-choice tests, presentations, open-ended questions, and projects for online assessment. Similarly, Capperucci and Salvadori (2021) found that open-ended exams and multiple-choice questions are the most preferred assessment types, whereas peer assessment, self-assessment, checklists, rubrics, and digital concept maps are the least preferred. In contrast, Martin et al. (2019) investigated the online assessment practices of award-winning faculty and found that they employ a diverse range of assessments, incorporating both traditional and alternative methods. These emphasize the importance of integrating methods that can track students' development and provide autonomy in the learning process. Such an argument implies there is a need for lecturers to use other ways to monitor a student's progress and ensure autonomy during the online teaching process.

The results reveal several problems that instructors experience that are congruent with the Technological Pedagogical Content Knowledge (TPACK) model. Such include low student participation, infrastructure deficiencies, complications of preparing online assessments, students' lack of online system knowledge, and evaluation challenges. Instructors grapple with time-consuming processes, Learning Management System (LMS) issues, and exam security concerns.

TPACK integration is evident, with instructors addressing these challenges through a blend of technological expertise, effective teaching strategies, and content knowledge. This demonstrates the importance of incorporating TPACK into teacher training programs to equip instructors with the necessary skills and knowledge to effectively integrate technology into their teaching practices (Chai et al., 2011). Supporting studies (Battal et al., 2022; Wattanakasiwich et al., 2021) corroborate these challenges, emphasizing issues related to ICT access, fairness in online assessment, student-centered teaching, and readiness for online learning. The findings highlight the importance of addressing these challenges and providing support to instructors in terms of technological resources, professional development, and guidance on effective pedagogical approaches.

To address the challenges and enhance the reliability of online assessment results, the instructors employ a range of precautions. These precautions are categorized into themes, including those related to the assessment tool, the assessment process, the assessor (instructor), and the Learning Management System (Canvas). Some of the instructors focus on enhancing question quality, favoring multiple-choice questions to predict higher-order thinking skills, and using diverse assessment tools to minimize errors. Precautions such as developing a question bank, peer assessment, and self-control and monitoring are implemented to ensure the effectiveness of assessment tools. Moreover, there are precautions that should be put into place during an assessment process, such as considerations for exam duration and control policies, informing students, and encouraging participation in events for professional development. Similarly, in the learning management system, the instructors rearrange the options, allow only one answer, use non-repeat questions, and seek help from others to address technical challenges. Therefore, the instructors' preferences for these precautions are based on a strategic and systematic approach to ensure the reliability, fairness, and effectiveness of online assessments. Taken together, these make up an effective assessment regime, aligned with academic standards and leading to better performance evaluation. The research findings align with the Technological Pedagogical Content Knowledge (TPACK) model, illustrating how instructors integrate technological, pedagogical, and content knowledge to address challenges and enhance the reliability of online assessments. In terms of Technological Knowledge (TK), the instructors demonstrate proficiency by employing a variety of assessment tools and strategically utilizing features within the Learning Management System (LMS), such as randomized questions and single test entries. Pedagogical Knowledge (PK)

is evident in their emphasis on question quality, the preference for higher-order thinking skills in assessments, and the tailoring of exam policies to enhance fairness. Content Knowledge (CK) is reflected in practices such as aligning questions with instructional objectives and providing alternative forms of assessments that allow for a comprehensive evaluation of student understanding or comprehension. This is consistent with previous research that showed comparable prevention strategies, such as performance-oriented assessments and the use of higher-order thinking questions (Balta & Türel, 2013; Capperucci & Salvadori, 2021). The recommendation to conduct formative assessments aligns with the holistic TPACK approach, emphasizing the integration of technological, pedagogical, and content knowledge to enhance online assessment quality (Shraim, 2019).

This research further examines the practices and precautions to increase its validity. Internal validity themes were test content evidence, enhancing legibility, as well as implications of testing evidence. The instructors stressed the importance of aligning exams with defined learning aims and course results, utilizing communication techniques that increase lucidity and clarity during assessments, and using alternative evaluation methods to improve the impacts of testing. This paper focuses on some of the methods instructors use to build credibility in outcomes through the TPACK framework. Pedagogical Knowledge (PK) is evident in strategies to improve comprehension and align test content with course outcomes. Content Knowledge (CK) is reflected in applying different assessment tools to enhance implications. However, the analysis reveals that instructors haven't employed Technological Knowledge (TK) to address external validity measures. Despite the instructors emphasis on the precautions associated with internal validity, they haven't explicitly addressed considerations for external validity. Several possible reasons may clarify why the instructors could overlook TK when addressing issues relating to external validity quantification. This can be due to insufficient knowledge of using advanced technology to assess external validity. Secondly, there could be a lack of support or resources from the institution to increase external validity. In addition, the instructors might value measures of internal validity as the main way to judge quality. Addressing this gap may require targeted professional development, institutional emphasis on holistic validity considerations, and the integration of technological strategies specifically tailored for enhancing external validity.

In conclusion, the findings demonstrated the challenges that instructors face during online assessment and evaluation. The strategies implemented to tackle these challenges demonstrate an

approach that addresses assessment tools, processes, assessors, and the online system as a whole. The spotlight on validity, aligning assessments with learning goals, underscores instructors' commitment. In Technological Knowledge (TK), they adeptly use diverse tools and communication, showcasing their expertise. Pedagogical Knowledge (PK) is evident in aligning assessments with objectives and enhancing understanding. Content Knowledge (CK) is demonstrated through their dedication to ensuring the representation of course material through test content evidence. However, challenges arise from the inability to fully integrate these three knowledge areas, indicating struggles with TPACK utilization.

Practical Implications

The paper may also yield some practical implications for instructors, educational institutions, and policymakers in the area of online assessment and evaluation. The statement also notes that most lecturers involved show average self-efficacy about online learning, and hence demands should be placed on professional programs. This implies that institutions can come up with training programs aimed at improving instructors' competence towards designing instructional activities targeted at higher-order thinking and an objective system of assessing students' success. The identified problems, like poor student participation, a lack of proper institutions, and the preparation of examinations, will require institutional assistance and the mobilization of resources. For institutions to be successful, they might have to adopt some strategies like investing in technological infrastructure, providing ongoing instructor support regarding online tools, and encouraging faculty to share their experiences with their peers. The high levels of assessment, such as the common use of summative assessments and more preferable assignments and project approaches, require different approaches through varying the methods so as to accommodate all students' strengths. Instructors can be guided into further examination of diverse tools and approaches towards assessment that are well synchronized with learning objectives through professional development schemes.

Additionally, the findings on the precautions taken by lecturers to enhance the reliability and validity of online assessments indicate the importance of promoting best practices in assessment design and implementation. For example, institutions can develop guidelines and provide continuous support for instructors on items like question quality, diversity of assessment instruments, and methods to ensure the reliability and authenticity of results.

The technical support unit at the university currently assists in resolving solely technological issues, overlooking the evident demand for techno-pedagogical assistance among lecturers, as indicated by the research findings. Therefore, it becomes necessary for these teachers to create ideal circumstances for learning and growth. Creating these environments would benefit from collaborative efforts involving experts in assessment and evaluation, educational technology, and subject matter specialists. By working together, these professionals can create a comprehensive professional development environment tailored to meet the distinct needs of lecturers. This environment may foster a more accurate alignment of technological and pedagogical support.

Limitations and Future Directions

This study acknowledges several limitations that have implications for the data's credibility and generalizability. Primarily, the reliance on self-reported data from participants introduces an inherent bias, as responses may reflect perceived rather than actual practices and competencies. Such data are subject to social desirability bias, where respondents may overestimate their engagement with effective online assessment practices or underreport challenges due to concerns about professional image.

Furthermore, the variable level of technology expertise among instructors constitutes a significant limitation. Given the diverse technological backgrounds of participants, their self-assessments of online teaching and assessment practices might not accurately represent their actual proficiency. This variation could influence the study's findings, as instructors with higher technological proficiency may have more positive experiences and perceptions of online assessment, skewing the results.

These limitations impact the study's data credibility and generalizability. The reliance on self-reported data may not fully capture the intricacies of online assessment practices or accurately reflect instructors' technological competencies. The variability in instructors' technology expertise could influence the study's applicability to different educational contexts, as findings may be more representative of those with higher levels of technological proficiency.

To mitigate these limitations, future research could incorporate a mixed-methods approach, combining surveys with interviews and classroom observations, to obtain a more comprehensive understanding of online assessment practices. Additionally, employing a stratified sampling

strategy to include instructors with varying levels of technological expertise could provide a more nuanced analysis of how technology proficiency impacts online assessment practices.

References

- Akram, H., Yingxiu, Y., Al-Adwan, A. S., & Alkhalifah, A. (2021). Technology integration in higher education during COVID-19: An assessment of online teaching competencies through technological pedagogical content knowledge model. *Frontiers in Psychology*, 12, 1-11. <https://doi.org/10.3389/fpsyg.2021.736522>
- Amelung, M., Krieger, K., & Rösner, D. (2011). E-Assessment as a service. *IEEE Transactions on Learning Technologies*, 4(2), 162-174. <http://dx.doi.org/10.1109/tlt.2010.24>
- Arslan, K., Semenderoğlu, A., & Uyanık, E. (2022). An investigation of students' preferences, satisfaction and performance in online assessment amidst the COVID-19 Pandemic in Türkiye. *Malaysian Online Journal of Educational Technology*, 10(4), 294-305. <http://dx.doi.org/10.52380/mojet.2022.10.4.439>
- Aslan-Altan, B. A., & Karalar, H. (2022). Assessment and evaluation activities in emergency remote teaching: Voice of prospective teachers. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 18(3), 259-275. <http://dx.doi.org/10.17860/mersinefd.943824>
- Balta, Y. (2014). *Online course providers views towards online measurement and evaluation methods in Turkey* [Unpublished master's thesis]. Firat University. <https://acikerisim.firat.edu.tr/xmlui/bitstream/handle/11508/12314/363092.pdf?sequence=1&isAllowed=y>
- Battal, A., Polat, H., & Kayaduman, H. (2022). Assessment in online education during the COVID-19 pandemic: From the perspective of university instructors. *e-Kafkas Journal of Educational Research*, 9(3), 1072-1085. <https://doi.org/10.30900/kafkasegt.1120520>
- Bennett, R. E. (2005). Inexorable and inevitable: The continuing story of technology and assessment. In D. Bartram, & R. K. Hambleton (Eds.), *Computer-based testing and the internet*. John Wiley & Sons. <https://doi.org/10.1002/9780470712993.ch11>
- Boevé, A. J., Meijer, R. R., Albers, C. J., Beetsma, Y., & Bosker, R. J. (2015). Introducing computer-based testing in high-stakes exams in higher education: Results of a field experiment. *PloS One*, 10(12), 1-13. <https://doi.org/10.1371/journal.pone.0143616>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>

- Büyüköztürk, Ş., Çakmak, E. K., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2023). *Research methodology in education* (34th edition). PEGEM Akademi.
- Capperucci, D., & Salvadori, I. (2021). Learning and performance evaluation in distance higher education: A case study during the Covid- 19 pandemic. *MATEC Web of Conferences* 343, 11004. <https://doi.org/10.1051/mateconf/202134311004>
- Chai, C. S., Koh, J. H. L., Tsai, C. C., & Tan, L. L. W. (2011). Modeling primary school pre-service teachers' Technological Pedagogical Content Knowledge (TPACK) for meaningful learning with information and communication technology (ICT). *Computers & Education*, 57(1), 1184-1193. <https://doi.org/10.1016/j.compedu.2011.01.007>
- Creswell, J. W. (2012). *Educational research*. Pearson.
- Çağıltay, K., Yıldırım, Arslan, İ., Gök, A., Gürel, G., Karakuş, T., Saltan, F., Uzun, E., Ülgen, E., & Yıldız, İ. (2007, January 31). *Habits and expectations for the use of instructional technologies at university: A descriptive study* [Conference presentation abstract]. IX. Academic Informatics Conference, Kütahya, Türkiye.
- Çam, Ş. S., & Koç, G. (2021). A needs analysis study on technological pedagogical content knowledge of faculty members. *Education and Information Technologies*, 26(5), 5337-5363. <https://doi.org/10.1007/s10639-021-10540-0>
- Çelik, S. (2011). Technology integration levels of teacher education faculty. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, 44(2), 141- 163. <http://dx.doi.org/10.17679/iuefd.16259330>
- Dermo, J. (2009). e-assessment and the student learning experience: A survey of student perceptions of e-assessment. *British Journal of Educational Technology*, 40(2), 203-214. <https://doi.org/10.1111/j.1467-8535.2008.00915.x>
- Doukas, N., & Andreatos, A. (2007). Advancing electronic assessment. *International Journal of Computers Communications & Control*, 2(1), 56-65. <https://univagora.ro/jour/index.php/ijccc/article/view/2337>
- Dunn, L., Morgan, C., O'Reilly, M., & Parry, S. (2003). *The student assessment handbook: New directions in traditional and online assessment*. Routledge.
- Elhaty, I. A., & Elhadary, T. (2023). Online education in Turkish universities after the earthquake: the pros and cons. *Journal of Survey in Fisheries Sciences*, 10(4), 330-340. <https://doi.org/10.17762/sfs.v10i4S.685>
- Farhat, A., Farhat, N., Abou Yassine, W., Halat, R., & El Khatib, S. (2021). University instructors' perceptions toward online teaching at the onset of the COVID-19 outbreak in Lebanon: A descriptive study. *Middle Eastern Journal of Research in Education and Social Sciences*, 2(2), 37-57. <http://dx.doi.org/10.47631/mejress.v2i2.243>

- Fein, A. D., & Logan, M. C. (2003). Preparing instructors for online instruction. *New Directions for Adult and Continuing Education*, 2003(100), 45-55. <https://doi.org/10.1002/ace.118>
- Forrester, A. (2020). Addressing the challenges of group speaking assessments in the time of the Coronavirus. *International Journal of TESOL Studies*, 2(2), 74-88. <https://doi.org/10.46451/ijts.2020.09.07>
- Gaytan, J., & McEwen, B. C. (2007) Effective online instructional and assessment strategies. *American Journal of Distance Education*, 21(3), 117-132. <https://doi.org/10.1080/08923640701341653>
- Georgina, D. A., & Olson, M. R. (2008). Integration of technology in higher education: A review of faculty self-perceptions. *The Internet and Higher Education*, 11(1), 1-8. <https://doi.org/10.1016/j.iheduc.2007.11.002>
- Ghanbari, N., & Nowroozi, S. (2021). The practice of online assessment in an EFL context amidst COVID-19 pandemic: Views from teachers. *Language Testing in Asia*, 11, 1-18. <http://dx.doi.org/10.1186/s40468-021-00143-4>
- Gikandi, J. W., Morrow, D., & Davis, N. E. (2011). Online formative assessment in higher education: A review of the literature. *Computers & Education*, 57(4), 2333-2351. <http://dx.doi.org/10.1016/j.compedu.2011.06.004>
- Guerrero-Roldán, A. E., Rodríguez-González, M. E., Karadeniz, A., Kocdar, S., Aleksieva, L., & Peytcheva-Forsyth, R. (2020). Students' experiences on using an authentication and authorship checking system in e-assessment. *Hacettepe University Journal of Education*, 35(Special Issue), 6-24. <http://dx.doi.org/10.16986/huje.2020063670>
- Haider, A. S, Hussein, R. F., & Saed, H. A. (2022). Jordanian University instructors' practices and perceptions of online testing in the COVID-19 Era. *Frontiers in Education*, 7, 1-7. <http://dx.doi.org/10.3389/feduc.2022.856129>
- Harlen, W., & James, M. (1997) Assessment and learning: Differences and relationships between formative and summative assessment. *Assessment in Education: Principles, Policy & Practice*, 4(3), 365-379. <http://doi.org/10.1080/0969594970040304>
- Hayes, A. F., & Coutts, J. J. (2020). Use omega rather than Cronbach's alpha for estimating reliability. But... *Communication Methods and Measures*, 14(1), 1-24. <http://dx.doi.org/10.1080/19312458.2020.1718629>
- Hettiarachchi, E., Huertas, M. A., & Mor, E. (2013). Addressing formative e-assessment for high-level cognitive courses at a fully online university. *Proceedings of the ICERI2013*, 2110-2116. <https://library.iated.org/view/HETTIARACHCHI2013ADD>
- Hofstede, G. (1980). Culture and organizations. *International Studies of Management & Organization*, 10(4), 15-41.

- Hussein, E., Daoud, S., Alrabaiah, H., & Badawi, R. (2020). Exploring undergraduate students' attitudes towards emergency online learning during COVID-19: A case from the UAE. *Children and Youth Services Review*, 119, 1-7. <https://doi.org/10.1016/j.childyouth.2020.105699>
- Jaipal-Jamani, K., Figg, C., Collier, D., Gallagher, T., Winters, K. L., & Ciampa, K. (2018). Developing TPACK of university faculty through technology leadership roles. *Italian Journal of Educational Technology*, 26(1), 39-55. <https://www.learntechlib.org/p/184086/>
- JISC. (2010). Effective assessment in a digital age: A guide to technology-enhanced assessment and feedback. *Technology Enhanced Assessment*, pp. 26-28. HEFCE, London. http://www.jisc.ac.uk/media/documents/programmes/elearning/digiassass_eada.pdf
- Jordan, S. (2013). E-assessment: Past, present and future. *New Directions in the Teaching of Physical Sciences*, 9(1), 87-106. <http://dx.doi.org/10.29311/ndtps.v0i9.504>
- Kabaran, H., & Aykaç, N. (2018). Investigating the instructors' technological pedagogical content knowledge in terms of different variables: The sample of Muğla Sıtkı Koçman University. *TÜBA Higher Education Research*, 8(3), 322-333. <http://dx.doi.org/10.2399/yod.18.018>
- Karademir, A., Yaman, F., & Saatçioğlu, Ö. (2020). Challenges of higher education institutions against COVID-19: The case of Turkey. *Journal of Pedagogical Research*, 4(4), 453-474. <http://dx.doi.org/10.33902/jpr.2020063574>
- Karahoca, M., Çicek, M., & Güneş, A. (2021). The effect of pandemic on medical education and distance learning experience. *Tıp Eğitimi Dünyası*, 20(60), 87-90. <https://doi.org/10.25282/ted.795634>
- Kline, R. B. (2016). *Principles and practice of structural equation modeling*. Guilford Publications.
- Koç, A., Uzun, N. B., & Ünalı-Coral, M. N. (2022). Development of the self-efficiency scale for online measurement and evaluation. *International Journal of Social Sciences and Education Research*, 8(1), 87-98. <https://doi.org/10.24289/ijsser.1031155>
- Koehler, M. J., Mishra, P., Kereluik, K., Shin, T. S., & Graham, C. R. (2014). The technological pedagogical content knowledge framework. In Spector, J., Merrill, M., Elen, J., Bishop, M. (Eds.), *Handbook of research on educational communications and technology*. Springer, New York, NY. https://doi.org/10.1007/978-1-4614-3185-5_9
- Kulkarni, C., Wei, K. P., Le, H., Chia, D., Papadopoulos, K., Cheng, J., ... & Klemmer, S. R. (2013). Peer and self assessment in massive online classes. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 20(6), 1-31.

- Leary, H., Dopp, C., Turley, C., Cheney, M., Simmons, Z., Graham, C. R., & Hatch, R. (2020). Professional development for online teaching: A literature review. *Online Learning*, 24(4), 254-275. <https://doi.org/10.24059/olj.v24i4.2198>
- Lissitz, R. W., & Samuelson, K. (2007). A suggested change in terminology and emphasis regarding validity and education. *Educational Researcher*, 36(8), 437-448.
- Marriott, P., & Teoh, L. (2019). *Computer-based assessment and feedback: Best practice guidelines*. The Higher Education Academy. <https://www.advance-he.ac.uk/knowledge-hub/computer-based-assessment-and-feedback-best-practice-guidelines>
- Martin, F., Ritzhaupt, A., Kumar, S., & Budhrani, K. (2019). Award-winning faculty online teaching practices: Course design, assessment and evaluation, and facilitation. *The Internet and Higher Education*, 42, 34-43. <https://doi.org/10.1016/j.iheduc.2019.04.001>
- McGee, P., Windes, D. & Torres, M. (2017). Experienced online instructors: Beliefs and preferred supports regarding online teaching. *Journal of Computing Higher Education*, 29, 331–352. <https://doi.org/10.1007/s12528-017-9140-6>
- Meccawy, Z., Meccawy, M., & Alsobhi, A. (2021). Assessment in ‘survival mode’: Student and faculty perceptions of online assessment practices in HE during Covid-19 pandemic. *International Journal for Educational Integrity*, 17, 1-24. <http://dx.doi.org/10.1007/s40979-021-00083-9>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- Mosia, M., & Matabane, M. (2022). Exploring Factors that Serve as Predictors for Mathematics and Sciences Pre-Service Teachers to Use ICT in Teaching. *Research in Educational Policy and Management*, 4(1), 80-91. <https://doi.org/10.46303/repam.2022.10>
- Nikou, S. A., & Economides, A. A. (2018). Mobile based micro-learning and assessment: Impact on learning performance and motivation of high school students. *Journal of Computer Assisted Learning*, 34(3), 269-278. <https://doi.org/10.1111/jcal.12240>
- Odularu, O., Puzi, M., Ngqila, K., & Olatoye, T. (2022). Transformations in Higher Educational Institutions: A Review of the Post-COVID-19 Era. *Journal of Culture and Values in Education*, 5(1), 183-194. <https://doi.org/10.46303/jcve.2022.13>
- Önal, N., & Çakir, H. (2015). Self confidence perceptions of faculty of education academic staff on technological pedagogical content knowledge. *Journal of Hasan Ali Yücel Education Faculty*, 12(2), 117-131. <https://www.proquest.com/scholarly-journals/egitim-fakültesi-öğretim-elemanlarinin-teknolojik/docview/1760262174/se-2>

- Ras, E., Whitelock, D., & Kalz, M. (2015). The promise and potential of e-assessment for learning. In P. Reimann, S. Bull, M. Kickmeier-Rust, R. Vatrpu, & B. Wasson (Eds.), *Measuring and visualising learning in the information-rich classroom* (pp. 21–40). Routledge.
- Redecker, C., Punie, Y., & Ferrari, A. (2012). eAssessment for 21st Century Learning and Skills. In Ravenscroft, A., Lindstaedt, S., Kloos, C. D., Hernández-Leo, D. (Eds.), *21st century learning for 21st century skills*. Lecture Notes in Computer Science, vol 7563. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-33263-0_23
- Reeves, T. C. (2000). Alternative assessment approaches for online learning environments in higher education. *Journal of Educational Computing Research*, 23(1), 101-111. <https://doi.org/10.2190/GYMQ-78FA-WMTX-J06C>
- Ridgway, J., & McCusker, S. (2003). Using computers to assess new educational goals. *Assessment in Education: Principles, Policy & Practice*, 10(3), 309-328.
- Rolim, C., & Isaias, P. (2019). Examining the use of e-assessment in higher education: Teachers and students' viewpoints. *British Journal of Educational Technology*, 50(4), 1785-1800. <https://doi.org/10.1111/bjet.12669>
- Rovai, A. P. (2000). Online and traditional assessments: What is the difference?. *The Internet and Higher Education*, 3(3), 141-151. [https://doi.org/10.1016/S1096-7516\(01\)00028-8](https://doi.org/10.1016/S1096-7516(01)00028-8)
- Sari, H. (2020). Distance education in lockdown period: Why we should not quarantine measurement and evaluation?. *International Journal of Scholars in Education*, 3(1), 121-128. https://dergipark.org.tr/en/pub/ueader/issue/55302/730598?publisher=http-egitim-kilis-edu-tr-cv-durmu-c5-9e-burak-pdf#article_cite
- Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2009). Technological pedagogical content knowledge (TPACK). *Journal of Research on Technology in Education*, 42(2), 123–149. <https://doi.org/10.1080/15391523.2009.10782544>
- Shermis, M. D., Burstein, J., & Leacock, C. (2006). Applications of computers in assessment and analysis of writing. In McArthur, C. A., Graham, S., & Fitzgerald, J. (Eds.), *Handbook of writing research* (pp. 403-416). The Guilford Press.
- Shraim, K. (2019). Online examination practices in higher education institutions: Learners' perspectives. *Turkish Online Journal of Distance Education*, 20(4), 185-196. <http://dx.doi.org/10.17718/tojde.640588>
- Shuey, S. (2002). Assessing online learning in higher education. *Journal of Instruction Delivery Systems*, 16(2), 13-18. <http://www.salt.org/jidstoc.asp?key=97320>
- Solak, H. İ., Ütebay, G., & Yalçın, B. (2020). Uzaktan eğitim öğrencilerinin basılı ve dijital ortamdaki sınav başarılarının karşılaştırılması. *Açıköğretim Uygulamaları ve*

Araştırmaları Dergisi, 6(1), 41-52.
<https://dergipark.org.tr/en/pub/auad/issue/55639/761293>

- St-Onge, C., Ouellet, K., Lakhal, S., Dubé, T., & Marceau, M. (2022). COVID-19 as the tipping point for integrating e-assessment in higher education practices. *British Journal of Educational Technology*, 53(2), 349-366. <https://doi.org/10.1111/bjet.13169>
- Swallow, M. J. C., & Olofson, M. W. (2017) Contextual understandings in the TPACK framework. *Journal of Research on Technology in Education*, 49(3-4), 228-244. <https://doi.org/10.1080/15391523.2017.1347537>
- Şenel, S., & Şenel, H. C. (2021). Remote assessment in higher education during COVID-19 pandemic. *International Journal of Assessment Tools in Education*, 8(2), 181-199. <https://doi.org/10.21449/ijate.820140>
- Şimşek, Ö., Demir, S., Bağçeci, B., & Kınay, İ. (2013). Examining Technopedagogical Knowledge Competencies of Teacher Trainers in Terms of Some Variables. *Ege Journal of Education*, 14(1), 1-23. <https://dergipark.org.tr/en/pub/egeefd/issue/4902/67201>
- Tekin, M., Uysal, M., Uysal, İ., Uysal, A. Ç., & Toraman, Ç. (2022). Evaluation of healthcare students' views on measurement and evaluation methods applied in remote education. *Troia Medical Journal*, 3(2), 43-47. <https://doi.org/10.55665/troiamedj.1090435>
- Todd, W. R. (2020). Teachers' perceptions of the shift from the classroom to online teaching. *International Journal of TESOL Studies*, 2(2), 4-16. <https://doi.org/10.46451/ijts.2020.09.02>.
- Tosun, N. (2021). Distance education practices at universities in Turkey: A case study during COVID-19 pandemic. *International Journal of Curriculum and Instruction*, 13(1), 313-333. <https://ijci.globets.org/index.php/IJCI/article/view/532>
- Uerz, D., Volman, M., & Kral, M. (2018). Teacher educators' competences in fostering student teachers' proficiency in teaching and learning with technology: An overview of relevant research literature. *Teaching and Teacher Education*, 70, 12-23. <https://doi.org/10.1016/j.tate.2017.11.005>.
- Vasodavan, V., DeWitt, D., & Alias, N. (2019). TPACK in higher education: Analysis of the collaborative tools used by lecturers. *JuKu: Jurnal Kurikulum & Pengajaran Asia Pasifik*, 7(1), 9-17. <https://juku.um.edu.my/article/view/17500>
- Wattanakasiwich, P., Suree, N., Chamrat, S., Saengsuwan, W., Suttharangsee, W., Panrat, T., ... & Chantawannakul, P. (2021, October). *Investigating challenges of student centered learning in Thai higher education during the COVID-19 pandemic*. In 2021 IEEE Frontiers in Education Conference (FIE), Lincoln, NE, USA, pp. 1-7. <https://doi.org/10.1109/FIE49875.2021.96372>

- Whitelock, D., & Watt, S. (2008). Reframing e-assessment: Adopting new media and adapting old frameworks. *Learning, Media and Technology*, 33(3), 151-154.
<https://doi.org/10.1080/17439880802447391>
- Yüksel, H. S., & Gündüz, N. (2017). Formative and summative assessment in higher education: Opinions and practices of instructors. *European Journal of Education Studies*, 3(8), 336-356.