Journal of Education and e-Learning Research
Vol. 11, No. 3, 527-538, 2024
ISSN(E) 2410-9991 / ISSN(P) 2518-0169
DOI: 10.20448/jeelr.v11i3.5876
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Saudi faculty online assessment experience: Evidence from the COVID-19 era

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Abstract

E-learning has taken the lead over face-to-face instruction in higher education as a response to the COVID-19 pandemic. This shift forced faculty members to adapt to new roles and responsibilities to design and apply online instruction and assessments that require specific skills. This research aims to examine faculty experiences with online assessments during the COVID-19 pandemic at Imam Abdulrahman bin Faisal University (IAU). We used the quantitative study method to analyze faculty experience with online assessment practices during the pandemic using a structured questionnaire composed of 24 items to assess five main areas: faculty awareness, faculty satisfaction, challenges, best practices and suggestions for improvement. This study included one hundred and fifty-five faculty members between September and December 2020. The data obtained were analyzed using descriptive statistics including means, standard deviations, frequencies and percentages. Findings demonstrated high faculty awareness and satisfaction with IAU online assessment practices. However, they expressed they were challenged by their need to receive more faculty development programs on using online assessment and accurately assessing learning outcomes. Moreover, participants pointed out several best practices such as investing in learning management system tools for assessment and student feedback provision. Finally, the primary recommendation for enhancing online assessments was to provide faculty access to professional development training programmes. This study provides a reference for future research on student-centered online learning and assessment practices, accreditation of online assessment practices and strategies for assessing and compensating for learning loss during the pandemic.

Keywords: COVID-19, E-learning, Faculty development, Online, Satisfaction, Student assessment.

Citation | Almuqayteeb, T. A., & Mohamed, W. (2024). Saudi faculty online assessment experience: Evidence from the COVID-19 era. *Journal of Education and E-Learning Research*, *11*(3), 527–538. 10.20448/jeelr.v11i3.5876
History:
Received: 12 February 2024
Revised: 23 May 2024
Accepted: 4 June 2024
Published: 7 August 2024
Licensed: This work is licensed under a Creative Commons Attribution 4.0 License
Publisher: Asian Online Journal Publishing Group

Funding: This study received no specific financial support.
Institutional Review Board Statement: The Ethical Committee of the Imam Abdulrahman bin Faisal University, Saudi Arabia has granted approval for this study (Ref. No. 2024-15-097).
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

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Contribution of this paper to the literature

The current study examined faculty's experiences, perceptions and challenges they faced with online assessments during COVID-19. Limited published research has been done on faculty members' perspectives and experiences in various majors. This broad perspective will help pinpoint the most important online assessment strategies used by faculty during the pandemic.

1. Introduction

E-learning has rapidly replaced traditional face-to-face (f2f) instruction in higher education institutions (HEIs) as the "new norm" and the only viable alternative since the emergence of the coronavirus disease (COVID-19) pandemic in March 2020 (Abduh, 2021). Therefore, HEIs had to create and upgrade their technological resources (Jankowski, 2020) and new roles and duties are required according to their most recent digital experiences. Studies showed that during the pandemic, the professors' main concern was ensuring the continuity of the educational process by designing sessions and assessment tasks to determine the knowledge gained by students that reflected the final grade of the course (Azzi-Huck & Shmis, 2020; Martínez-Huamán, Landa, Mendoza, & Plata, 2022). Assessment was entirely transformed into an online modality (Khodamoradi, Maghsoudi, & Saidi, 2022). Although online learning and assessment have been helpful during such critical situations, studies have shown that implementing technology in education may create challenges for teachers (Abduh, 2021) and students (Lee, Lam, Lo, Lee, & Li, 2022).

Governments have deployed measures to adapt to the "new norm." Institutions varied in scope, intensity, methods (Gamage, Silva, & Gunawardhana, 2020; Rahim, 2020) and preparedness to face new challenges in the assessment process. Some of the most perplexing areas that institutions had to cope with were the issuance of guidelines, the design of online assessments (Rahim, 2020) and technical problems that might occur during the use of online assessment methods (Darling-Hammond & Hyler, 2020). In Saudi Arabia, the Ministry of Education (MOE) released a manual for university-level examinations and assessments during the COVID-19 pandemic (Ministry of Education, 2020). In response to that, Imam Abdulrahman Bin Faisal University (IAU) issued and circulated guidelines for online assessments during the COVID-19 pandemic to explain the design of online exams and the use of various online platforms. This had the dual goal of institutionalizing assessment practices across the university colleges and ensuring academic integrity in online assessments. Moreover, the Center for the Quality of Assessment and Examinations (QA Center), one of the key entities affiliated with the Vice Presidency for Academic Affairs (VPAA) provides IAU colleges with general guidelines and guidebooks to facilitate the implementation of best practices in student assessment and ensure online assessment quality. Blackboard, the learning management system was used by IAU and other Saudi universities to provide remote learning and online courses before the pandemic (Al-Samiri, 2021). Furthermore, VPAA formulated an online exam committee (OEC) in IAU colleges to supervise and report on the administration of online final exams.

Furthermore, the complexity of online assessment encourages HEIs to keep up with changes and innovations. HEIs have developed e-learning, distance education and technology-enhanced learning (TEL) as key educational activities that provide new opportunities and approaches to teaching and learning following the development of Information and Communication Technologies (ICT) (Stödberg, 2012; Tinoca, Pereira, & Oliveira, 2014). HEIs have sought to modernize their teaching and learning processes as new technologies are available in virtual learning environments such as Learning Management Systems (LMS), forums, discussion boards and e-portfolios. Moreover, the focus of teaching and learning in schools has changed from content-based to student-centered and outcome-based (Falcao & Soeiro, 2019). Consequently, online assessment which is an entirely electronic process that relies on digital technologies to develop, organize and deliver assessments in all forms including diagnostic, summative and formative emerged (Howarth, 2010). Various aspects of assessment from task design to result reporting shifted online (Committee, 2005). It is essential to understand faculty members' experiences with the online assessment process during the COVID-19 pandemic (Khan & Jawaid, 2020).

This study offers a great understanding of the faculty experiences with online assessments during the COVID-19 pandemic in Saudi Arabia. The shift from face-to-face teaching and learning to online education led to the necessity for faculty to take on new roles and responsibilities by using new technologies. It will be significant to understand faculty perceptions of this shift, the challenges that they faced and the recommendations for overcoming these challenges. Additionally, the study will aid HEIs in Saudi Arabia in identifying the most significant online assessment practices of faculty members during the COVID-19 pandemic. The researchers conducted this study to understand the state of online assessment during the outbreak of the coronavirus pandemic and to ensure the quality of online assessment processes in the future.

Previous studies indicated that creating an influential institutional culture for online assessment during emergencies and the "new norm" requires further investigation of faculty experience in various settings when shifting from face-to-face to full-time online teaching and assessment. The majority of higher education institutions in Saudi Arabia have documented the experiences of their students or faculty members with online instruction in specific majors such as English or medicine during the COVID-19 pandemic. However, there is a lack of research on the perspectives and experiences of faculty members in other majors. Therefore, this study aimed to fill the gap in the literature by analyzing faculty experiences with online assessments during the COVID-19 pandemic at IAU. The following research questions (RQs) were posed:

RQ1: What was the faculty awareness level regarding universities' online assessment practices during the COVID-19 pandemic?

RQ2: What was the faculty's level of satisfaction with the university's online assessment practices during the COVID-19 pandemic?

RQ3: What were the challenges faced by faculty members regarding the online assessments during the COVID-19 pandemic?

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RQ4: What were the faculty's best practices regarding the online assessments during the COVID-19 pandemic?

RQ5: What were the faculty's recommendations for improving online assessment practices during the COVID-19 pandemic?

2. Literature Review

2.1. Online Student Assessment in E-Learning

Weleschuk, Dyjur and Kelly (2019) described online assessment as any means of assessing student performance providing feedback or improving students' learning which can be completely online (such as online exams) or just require online submission (such as essays). Studies have demonstrated the benefits of online assessment for aiding student learning including offering flexible, effective and convenient assessment experiences for both students and teachers (Crisp, Guàrdia, & Hillier, 2016; De Villiers, Scott-Kennel, & Larke, 2016). For instance, it helps provide immediate feedback that enhances learning (Gilbert, Whitelock, & Gale, 2011), motivates students to improve their performance (Marriott, 2009) and promotes group work and higher-order thinking skills (HOTS). Furthermore, students' experiences with new e-learning technologies, such as online assessments were positive as demonstrated by their participation and enjoyment (Bailey, Hendricks, & Applewhite, 2015). Recently, during the COVD-19 pandemic, studies reported positive online experiences of student learning, including assessment.

Conversely, several studies have detailed the pitfalls and challenges of online assessments such as the requirement of extensive resources, including facilities and equipment, training and positive user attitudes towards technology and not being cost- or time-efficient (Rapanta, Botturi, Goodyear, Guàrdia, & Koole, 2020; Tinoca et al., 2014). In a recent study, investigated the perceptions of students in a Chinese language course at the University of Ghana in terms of the use of e-learning as a means of instruction. The researchers found that most students needed e-learning training to assist them learn at their convenience and pace. Additionally, they found that students used various devices such as tablets, desktop computers and cellphones which boosted their online learning engagement. They concluded that as online learning improves students' opportunities and skills, students show trust in it.

Moreover, previous studies investigated students' perceptions of online assessment during the COVID-19 pandemic (Hussain, Daoud, Alrabaiah, & Owais, 2020). The study revealed an inverse relationship between student grades and satisfaction with online assessments during the COVID-19 pandemic. Students with higher GPAs were less satisfied with both the online assessment and the pass or fail option. The study concluded the importance of maintaining unbiased and fair assessment solutions in current and future crises. Furthermore, studies have demonstrated that plagiarism and cheating are more accessible and frequent in online than paper-based assessments (Kocdar, Karadeniz, Peytcheva-Forsyth, & Stoeva, 2018; Pedersen, White, & Smith, 2012). This may influence the validity and reliability of online assessments (Kocdar et al., 2018).

Previous studies reported benefits when the online assessment design was aligned with fundamental principles. Online assessments must be authentic, consistent, fair and supported by accurate and valuable systems (Brink & Lautenbach, 2011). Moreover, they must be challenging, reflect real-world situations and demonstrate the skills required in real life (Baartman, Prins, Kirschner, & Van Der Vleuten, 2007). Effective online assessments include clear learning outcomes (LOs), carefully structured content, controlled workloads for faculty and students, integrated media, pertinent student activities and assessments strongly tied to the desired loss (Bates, 2019). Online assessments rely on a teacher's technological pedagogical content knowledge (TPACK) (Alruwais, Wills, & Wald, 2018) which entails a grasp of the complexity of relationships among students, teachers, content, technologies and practices (Archambault & Barnett, 2010). Therefore, teachers must reconsider their teaching methods and use Internet resources to be prepared for a seamless transition from in-person education to emergency remote teaching (Sarier & Uysal, 2022).

2.2. Faculty Experience of Online Student Assessment in the Era of COVID-19

HEIs have faced challenges in complying with the sudden shift in assessment from a physical setting to an online mode due to the COVID-19 pandemic (Rapanta et al., 2020). HEIs had to reexamine assessment procedures, alter organizational roles and interactions between teachers and students, plan effective online assessment methods, adapt new coping mechanisms for remote settings and find creative solutions (Kundu & Bej, 2021). Furthermore, teachers should employ valid and practical assessments in their online courses to create a thriving online learning environment (Khan & Jawaid, 2020). For instance, in the context of engineering education, faculty members have used new approaches such as changing or eliminating assignments and exams and had lower expectations for the quantity and caliber of work submitted by students (Chierichetti & Backer, 2021).

A growing body of literature has addressed teachers' beliefs, perceptions and attitudes as the central determinants of creating an environment conducive to online assessment success. Recently, several studies explored faculty members' confidence in and perceptions of e- learning and online assessment during the COVID-19 pandemic (Abduh, 2021; An, Adanu, Tutela, Berg, & Bartle, 2021; Bdair, 2021). For example, a study by Salleh, Jawawi, and Teo (2022) discovered that teachers' beliefs about e-learning have the potential to improve teaching performance. They reported that to overcome challenges posed by the COVID-19 pandemic, there is a need to focus on developing and influencing teachers' beliefs through raising their awareness regarding the potential for online education to improve their teaching performance and inspiring them to increase their satisfaction about the usefulness of online teaching and learning.

Furthermore, in the Saudi context, some recent studies have reported positive faculty experiences including an easy shift to online teaching and assessment (Abduh, 2021). For instance, a study conducted at Najran University revealed that EFL teachers expressed a moderate attitude towards online assessment as they found it helpful for teachers to improve their technological skills in assessing students using various techniques, facilitating recording grades into the electronic grade center and improving teachers' performance through management, pedagogical and technical support (Abduh, 2021). However, teachers reported some challenges they faced in assessing students

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online such as lack of physical interaction, assessment of speaking and translation courses, cheating and plagiarism and technical difficulties (Abduh, 2021). Another study found that nursing students and faculty members had moderate satisfaction with the new online teaching environment (Bdair, 2021). Furthermore, a study conducted by Almuwais, Alqabbani, Benajiba, and Almoayad (2021) at Princess Nourah bint Abdulrahman University in Saudi Arabia found that health-profession students and teachers are highly prepared to transition to online learning and are satisfied with the support offered by their institution. However, teachers noted certain issues including a lack of planning and the ongoing use of traditional methods of instruction, assessment and learning by both teachers and students without enough e-learning modulation since courses were designed to be delivered in a traditional mode. The researchers concluded that both teachers and students needed to adopt new methods of instruction and learning and communicate their decisions for the e-learning planning process (Almuwais et al., 2021).

Moreover, several studies have described the challenges faculty members face in shifting to online teaching and assessment practices. Faculty members may perceive online assessment as increasing their workload (Al-Samiri, 2021; Meccawy, Meccawy, & Alsobhi, 2021). Another key challenge expressed by both faculty and students was the low level of readiness to switch to online learning platforms due to poor internet connectivity, low data limitations, sluggish data speeds and the need for expensive hardware like smartphones and related software. Furthermore, the lack of technical knowledge regarding digital components and pedagogical tools was reported as an additional challenge (Cabello & Nemecio, 2020). Some faculty members are unsure of the formative and summative online assessments they should use despite the availability of assessment resources (An et al., 2021). Faculty members have expressed concern regarding academic integrity and student misconduct in online education (Chierichetti & Backer, 2021; Meccawy et al., 2021).

In the Saudi context, Alqurshi (2020) conducted a study in which 700 pharmacy students from 19 different regional colleges and 74 professors from 10 different regional institutions participated. They found that 60% of faculty members have raised concerns about the lack and difficulty of contact between students and teachers which has shown a strongly negative relationship with overall learner satisfaction during the pandemic. This finding is also supported by Mohd Ghani et al. (2022) who found that some of the challenges that students face during online learning are interacting between students and teachers, interacting with classmates during the final projects and interacting with technology. Alturise's (2020) study which was conducted at colleges in the western branch of Qassim University indicates that 77.17% of students believe that it is challenging to engage in conversations and find answers to their queries in online courses since these courses lack the applied content necessary to completely comprehend the phenomena. In addition, faculties have reported difficulty assessing students owing to the lack of practical work in online mode (Alturise, 2020). In the study done by Abduh (2021), it was reported that some challenges that teachers faced in the transition to online mode included difficulty in assessing students in speaking and translation courses, the high risk of cheating and plagiarism and assessing a large number of students. These challenges reveal the serious impact of these factors on assessing students in full-time online learning.

Studies have reported that faculty members recommended several strategies such as providing adequate faculty development programs, one-to-one consultations, online resources, guidance (An et al., 2021) using cameras, plagiarism detection software (Montenegro-Rueda, Luque-de la Rosa, Sarasola Sánchez-Serrano, & Fernández-Cerero, 2021), remote monitoring systems and ZOOM-supervised exams (Linden & Gonzalez, 2021) to reduce misconduct and maintain authenticity and academic integrity in online assessments.

3. Methods

3.1. Research Approach

The study outlined in this paper constitutes a part of a broader investigation of student assessment practices during COVID-19 (Mohamed & Almuqayteeb, 2023). The research necessitates following a descriptive research design to systematically analyze faculty experience with online assessment during the pandemic. This approach was selected for its suitability for providing a comprehensive examination faculty. We employed a quantitative analysis of the collected data through a structured self-reported questionnaire to achieve our research objectives. It was meticulously developed to assess five key areas: awareness, satisfaction, challenges, best practices and recommendations for improvement.

3.2. Study Context

Over the last decade, Saudi Arabia has become a noteworthy case as it has experienced positive educational changes (Alghamdi, Alotaibi, & Ibrahim, 2020). As a result, the Saudi Ministry of Higher Education has selected three independent universities, including Imam Abdul Rahman bin Faisal University (IAU) to become a part of a new "Universities Bylaw" to contribute to the Saudi economy and development. Similar to HEIs worldwide, IAU began transitioning to remote learning environments in a brief timeframe with the emergence of COVID-19 (Al-Samiri, 2021). The Saudi Ministry of Education (MOE) released a manual for university-level examinations and assessments during the COVID-19 pandemic. Additionally, Saudi universities issued and circulated guidelines for online assessments during the COVID-19 pandemic to explain the design of online exams and the use of various online platforms. Moreover, the QA Center at IAU provided colleges with general guidelines and guidebooks to facilitate the implementation of best practices in student assessment and ensure online assessment quality. Furthermore, VPAA requested the IAU colleges establish an online exam committee (OEC) to supervise and report on the administration of online final exams.

3.3. Study Population and Sample

The target population of this study was faculty members at IAU, a mid-sized Saudi university (N = 3027) in the Eastern Province. Data was collected between September and December 2020. This study employed non-probability convenience sampling (Martínez-Mesa, González-Chica, Duquia, Bonamigo, & Bastos, 2016) as participants were voluntarily recruited through email invitations through established networks (emails and WhatsApp groups). One hundred and fifty-five completed the online questionnaire. The participants were from four academic disciplines: health, science and management, engineering and the arts and humanities. Most

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participants were women and Ph.D. holders. Frequencies and percentages of sample characteristics are shown in Table 1. A cover page describing the study aims was included in the questionnaire and by proceeding, participants agreed to the use of their data only for the research. This was taken as informed consent. Finally, ethical approval by the IRB committee at IAU was obtained.

Table 1. Frequencies and percentages of sample characteristics (N=155).

Demographic variables	Sub-group	Frequency	Percent (%)
Academic cluster	Health colleges	42	27.10
	Engineering colleges	12	7.74
	Science and management	46	29.68
	Arts and humanities	55	35.48
Sex	Men	56	36.13
	Women	99	63.87
Educational qualification	Obtained Ph.D.	97	62.58
	MA or BA	58	37.42

3.4. Measures

A structured self-report questionnaire was developed and validated in Arabic and English as an appropriate strategy for collecting quantitative data (Creswell, 2014). Ten experts in education and student assessment were requested to judge the clarity of the items' wording, appropriateness, relevance to the assessed construct and equivalence of Arabic and English phrasing to ensure face and content validity. The experts were selected based on their expertise in education, assessment, experience and research interests in developing scales in teaching and learning-related areas. Several minor modifications were made. The revised questionnaire includes four main sections based on their feedback. The first section collected demographic information (academic cluster, gender and educational level). The second section comprised six items assessing the participants' awareness regarding university guidelines for student assessments during the COVID-19 pandemic. The third section comprised 12 items assessing academics' satisfaction levels with the university's assessment practices during COVID-19. A 4-point Likert scale was used (4 = strongly satisfied; 1= strongly dissatisfied). The fourth section included multiple-response questions that addressed the challenges, best practices and recommendations for improving online assessment practices during the COVID-19 pandemic. The use of multiple-response questions helped to easily code the responses of participants. Then, a small pilot study was conducted with colleagues to check participants' understanding and ensure the accuracy and validity of the translation. Finally, the questionnaire was created in "Question Pro". It was delivered online which is a cost-effective method with the potential to reach many participants and ensure respondents' anonymity (Wright, 2005) particularly during lockdowns. The response rate was boosted using multiple methods such as reminder emails, push notifications, etc. (Nulty, 2008).

3.5. Validity and Reliability

To examine the construct validity of the latent construct (Zainudin, 2015) for sections 2 and 3 of the instrument, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed through Analysis of Moment Structures using IBM ® SPSS® Amos™ 26 (Arbuckle, 2019) and JASP 0.18.3 (2024). First, all six items in section 2 were exposed to an EFA using oblique rotation (oblimin) to explore the correlative relations among manifest variables and model these relations with one or more latent variables (Goretzko, Pham, & Bühner, 2021).The Kaiser-Meyer-Olkin (KMO) measure verified the sampling adequacy for the analysis (.85). Bartlett's test of sphericity (156) = 516.267, $p < .001$ indicating that the correlation structure is adequate for EFA. The Kaiser's criterion of eigenvalues greater than 1 yielded a one-factor model (an eigenvalue of 3.8) as the best fit for the data, accounting for 57.3% of the variance. The overall value of factor loading for each item was over 0.40 indicating enough significance to confirm the meaningfulness of the questionnaire (Howard, 2016) and values ranged from 0.64 to 0.91. Additionally, to confirm the original factorial structure of section 2, a CFA with the maximum likelihood estimation method was used in the AMOS program. The model fit was evaluated using the more popular fit indices (Byrne, 2013; Hu & Bentler, 1999; Zainudin, 2015) as chi-square divided by degrees of freedom (CMIN/DF) = 0.79, root mean square residual (RMSEA) = 0.00, root mean square residual (RMR) = 0.006; goodness of fit index (GFI) = 0.98, adjusted goodness of fit index (AGFI) = 0.96, comparative fit index (CFI) = 1.00, NFI = 0.98; incremental fit index (IFI) =1.00, Tucker-Lewis index (TLI) =1.00 and Akaike Information Criterion (AIC) (default model=33.58, less than the independence model=537.88). The reported indices confirmed the scale's suitability. Moreover, section 2 was observed to have good reliability using Cronbach's alpha = 0.88 and construct reliability using McDonald's omega coefficient = 0.876 (Hayes & Coutts, 2020) while the average variance extracted (AVE) was acceptable at 0.559 (Abdelrahman, Al-Adwan, & Hasan, 2022; Zainudin, 2015).

Second, all 12 items in section 3 which measure faculty satisfaction level with the university's online assessment practices were analysed using EFA with Principle Axis Factoring (PAF) which is prompted to provide accurate results in most situations (Howard, 2016) and oblique rotation (oblimin). The Kaiser-Meyer-Olkin (KMO) measure verified the sampling adequacy for the analysis (.92) and Bartlett's test of sphericity showed (156) = 1291.93, $p < .001$ indicating that the correlation structure is adequate for EFA (Howard, 2016). Furthermore, the data showed that Kaiser's criterion of eigenvalues greater than 1 yielded a two-factor model. However, we relied on the Visual Scree Plot (VSP) method as one of the most popular factor retention methods due to its accuracy beyond the Kaiser criterion and the need for simple cutoffs based on the study by Howard (2016).The VSP method indicated a one-factor model as the best fit for the data accounting for 59.87% of the variance. Moreover, the overall value of factor loading for each item over 0.40 is significant enough to confirm the meaningfulness of the questionnaire (Howard, 2016) and the values of the primary factor ranged from 0.59 to 0.90. Additionally, a CFA with the maximum likelihood estimation method was used in the AMOS program to confirm the original factorial structure of section 2. We inspected the model fit of the one-factor model and the two-factor model. Results showed that the one-factor model had better fit indices using the more popular fit indices as CMIN/DF=1.33, RMSEA=0.046, RMR=.027; GFI=0.96, AGFI=0.90, CFI=0.99, NFI=0.97; IFI=0.99, TLI=0.98, and AIC (default

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model=114.01, less than the independence model=1352.55). The reported indices showed scale suitability. Moreover, section 5 was observed to have good reliability using Cronbach's alpha = 0.93 and the construct reliability using McDonald's omega coefficient = 0.94 (Hayes & Coutts, 2020) while the average variance extracted (AVE) was acceptable at 0.59 (Abdelrahman et al., 2022; Zainudin, 2015).

3.6. Statistical Analysis

In this study, we used IBM SPSS version 26.0 for data analysis. Prior to the main analysis, we guaranteed that only completed cases were included. The data was analyzed using descriptive statistics including means (M), standard deviations (SD), frequencies and percentages (%) for participants' responses to awareness, satisfaction, challenges, best practices and recommendations to address the research questions quantitatively. The results of these analyses were systematically organized and visualized using tables within the results section.

4. Results

We calculated the percentages of participants in each awareness category to answer RQ1. According to Table 2, 78.2%–84% of faculty reported being fully aware of IAU online assessment practices during the pandemic. Specifically, 82.7%, 83.3%, 78.2%, 80.1%, 81.4% and 84% of participants were fully aware of the university guidelines on student assessment for online midterm exams and final exams, the FAQ manual, the checklist for quality reviews of online exams, formulated committee for online exams and the support provided by the committee, respectively. In addition, a few participants, 3.2%–7.7% were unaware of IAU online assessment practices during the pandemic.

Table 2. Faculty awareness of university online assessment practices during COVID-19 (n=155).

Items	2		1		0		M	SD
	n	%	n	%	n	%		
1: The university guidelines and announcements on student assessment and grading for the online mid-term exams.	129	82.7	22	14.1	5	3.2	1.79	0.48
2: The university guidelines and announcements on student assessment and grading for the online final exam.	130	83.3	20	12.8	6	3.8	1.80	0.50
3: The frequently asked questions (FAQ) manual for the assessment and procedures of the remote online exams issued by the QA center.	122	78.2	26	16.7	8	5.1	1.74	0.57
4: The checklist for quality review of online exams (Mid - and final term) issued by the QA center.	125	80.1	22	14.1	9	5.8	1.74	0.56
5: The committee for OEC formulation at my college regarding the final exam.	127	81.4	17	10.9	12	7.7	1.74	0.59
6: I received an adequate support from OEC when I faced any challenge while administering online exams.	131	84	17	10.9	8	5.1	1.79	0.52

Note: 2= I am fully aware of, 1= I am partially aware of, 0= I am not aware of, M = Mean, SD = Standard deviation.

We calculated the percentages of participants in each satisfaction category (see Table 3) to answer RQ2. "Strongly agree" and "agree" indicated high satisfaction levels. Overall, 81.4% of participants were satisfied with the online assessment practices at IAU. The highest satisfaction was reported for "effective policies and procedures for student assessment" (93.5%) followed by "ease of application of university guidelines" (89.9%). Moreover, the participants reported moderate satisfaction with the following items: "online assessment tools helped assess course learning outcomes (CLOs)" (78.8%) "considered the needs and tendencies of students" (74.4%) and "enhanced self-learning skills" (71.8%) "saved time and effort" (75%). Low satisfaction was reported for "reduced exam anxiety" (68.6%) and "showing individual differences among students" (55.1%).

Table 3. Percentage of faculty satisfaction with the university's online assessment practices (n=155).

Item	Strongly agree		Agree		Disagree		Strongly disagree		M	SD
	N	%	n	%	N	%	n	%		
1: The university promptly responded to COVID-19 by issuing new effective policies and procedures for student assessment.	106	67.9	40	25.6	5	3.2	5	3.2	3.5	0.71
2: The university guidelines for student assessment during COVID-19 were easy to apply.	99	63.5	41	26.3	11	7.1	5	3.2	3.5	0.77
3: The online assessment tools assessed all course learning outcomes.	74	47.4	49	31.4	25	16	8	5.1	3.2	0.90
4: The online assessment tools during COVID-19 helped me rapidly obtain my students' results compared to the assessment tools in direct instruction.	95	60.9	41	26.3	15	9.6	5	3.2	3.5	0.80
5: The online assessment tools during COVID-19 considered the needs and tendencies of the students in the digital era compared to the assessment tools used in direct instruction.	73	46.8	43	27.6	32	29.5	8	5.1	3.2	0.93
6: The online assessment methods allowed students to effectively participate in the assessment process compared to the assessment methods used during direct instruction.	58	37.2	39	25	43	27.6	16	10.3	2.9	1
7: The online assessment methods allowed for showing individual differences among students compared to the assessment methods used during	49	31.4	37	23.7	44	28.2	26	16.7	2.7	1.1

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Item	Strongly agree		Agree		Disagree		Strongly disagree		M	SD
	N	%	n	%	N	%	n	%		
direct instruction.										
8: The online assessment methods used kept up with the kingdom and international digital transformation trends compared to the assessment methods used during direct instruction.	89	57.1	45	28.8	17	10.9	5	3.2	3.4	0.81
9: The use of online assessment tools during COVID-19 enhanced self-learning skills as compared to the assessment tools used during direct instruction.	66	42.3	46	29.5	33	21.2	11	7.1	3.1	0.96
10: The use of online assessment tools during COVID-19 saved time and effort compared to the tools used during direct instruction.	81	51.9	36	23.1	24	15.4	15	9.6	3.2	1
11: The use of online assessment tools during COVID-19 reduced exam anxiety as compared to the use of assessment tools during direct instruction.	58	37.2	49	31.4	30	19.2	19	12.2	2.9	1
12: Overall, I view online assessment tools as a positive experience.	68	43.6	59	37.8	21	13.5	8	5.1	3.2	0.86

Table 4 summarizes the results of RQ3–RQ5 which addressed the challenges, best practices and recommendations regarding IAU assessment practices during the pandemic. The participants were given several options for selection. The responses for each selection were calculated and transformed into percentages in each area. The major challenge was "the need for faculty development on online assessment tools" (22.3%) whereas the lowest challenge was the "lack of guidebooks" (4.6%). In addition, the time and effort required to use online assessments were reported to be challenging (19.6%). Moreover, 15.2% reported inappropriate methods to assess CLOs. The least-reported challenges were the "need for more tutorial videos" (13.5%), "lack of developing item banks" (10.3%), "lack of resources and readiness" (e.g., Internet) (8.1%) and "learning assessment loss" (6.4%). For best practices, high percentages were found for "employing available online assessment tools on the blackboard" (19.4%), "ease of giving feedback to students" (18.4%) "using online assessment for formative purposes and enhancing students' learning" (17.8%) and "training students regarding the usage of online assessment tools" (17.3%). The lowest percentage was for "alignment of online assessment tools with the CLOs" (7.9%). For recommendations, the highest percentages were for "providing FD training workshops" (23.1%), "designing tutorial videos" (20.2%), and "developing exemplary models of online assessment tools" (19.3%). The lowest recommendations were for "raising awareness through developing guidebooks" (13.4%), "procedural guides" (12.7%) and "disseminating flickers and digital fliers on online assessment" (12.7%).

Table 4. Percentage of challenges, best practices and recommendations for improving online assessment during COVID-19 as expressed by faculty.

Challenges	Responses (n = 408)
1: Need more training on using online assessment tools.	22.3
2: Require lots of time and effort.	19.6
3: Inappropriateness of available tools to assess all CLOs.	15.2
4: Need more tutorial videos.	13.5
5: Lack of developing item banks.	10.3
6: Lack of resources and readiness (ex., internet)	8.1
7: Loss and gap of LOs assessment	6.4
8: Lack of guidebooks	4.6
Best practice	Responses (n = 501)
1: Employing the available online assessment tools on blackboard.	19.4
2: Easiness of giving feedback to students.	18.4
3: Using online assessment for formative purposes and enhancing students' learning.	17.8
4: Training students on using online assessment tools.	17.3
5: Assessing higher-order thinking skills.	10.2
6: Focus of online assessment on students 'participation.	9
7: Alignment of online assessment tools with the course LOs as in the assessment plan.	7.9
Recommendation	Responses (n = 425)
1: Providing training workshops.	23.1
2: Designing tutorial videos.	20.2
3: Developing models of online assessment tools.	19.3
4: Developing guidebooks.	13.4
5: Developing procedural guides.	12.7
6: Disseminating flickers on e-assessment.	11.3

5. Discussion

The purpose of this study was to gain a better understanding of the experience of faculty members regarding online assessment practices during the COVID-19 pandemic in the Saudi higher education context as teachers' beliefs significantly impact the educational process (Abduh, 2021). We examined the key five areas of online assessment practices: faculty awareness, faculty satisfaction, challenges, best practices and suggestions for improvement. This study contributes to the knowledge of online assessment practices in HEIs particularly during emergencies. In this regard, our results showed high levels of faculty awareness and satisfaction regarding university online assessment practices during COVID-19 which are both vital for the successful transition and

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implementation of online assessments. The pattern of high faculty awareness levels in this study supports the view that Saudi universities, similar to other HEIs worldwide complied with the guidelines for online assessment during the pandemic disseminated at the governmental and institutional level (Al-Samiri, 2021). Additionally, our university issued and circulated guidelines for online assessments to faculty to describe the required measures for designing and implementing assessments through various online platforms. This institutional support aimed to normalize assessment practices across university colleges, raise faculty awareness of online assessment practices and ensure academic integrity. The present results are consistent with previous literature demonstrating that institutional support facilitates the implementation of online teaching, learning and assessment practices for faculty and students (Al-Fraihat, Joy, & Sinclair, 2020; Montenegro-Rueda et al., 2021) fosters faculty preparedness and confidence and develops a common language of assessment (An et al., 2021) which might interpret and relate to the high levels of faculty awareness. Additionally, our results support the claim that the formulation of OEC for managing remote exams in all colleges strengthened faculty involvement, raised awareness and cultivated an institutional culture of improvement, accordingly (Grunwald & Peterson, 2003). Furthermore, this practice reinforces communication regarding existing resources for online assessment practices on campus and where and how to access them (An et al., 2021) which might also relate to the high levels of faculty awareness regarding the university's online assessment practices during the pandemic.

Moreover, our study emphasized high levels of faculty satisfaction with the online assessment practices during the COVID-19 pandemic. This result echoes the similar finding of positive faculty experience as evidence for an easy shift to online teaching and assessment (Abduh, 2021). Meanwhile, the study by Bdair (2021) found moderate satisfaction levels among faculty with the new online teaching environment in the Saudi context. The present study has shown high satisfaction levels with the support offered by the institution which is consistent with the study of Almuwais et al. (2021) at another Saudi university. It is worth noting that low levels of faculty satisfaction were observed in the Saudi context with institutional support indicating a clear gap between policy and practice, especially regarding technology as an educational demand of the 21st century (Al-Zahrani, 2015). Blundell, Castañeda, and Lee (2020) have pointed out the role of technology as a key factor influencing faculty satisfaction. Therefore, our findings of high faculty satisfaction could be explained by the preparedness of the university with technological tools such as LMS (Al-Samiri, 2021). Furthermore, it could be elucidated by the ease of shifting to online teaching and assessment during the COVID-19 pandemic (Abduh, 2021; Kundu & Bej, 2021), the identification of individual student needs consideration of diversity, equity and inclusion in assessment activities (Jankowski, 2020) and the flexibility, efficacy, reliability and validity of online assessments compared to paper-based examinations (Kundu & Bej, 2021). Previous studies have also revealed several factors contributing to high faculty satisfaction with online practices during COVID-19 such as institutional support (An et al., 2021; Blundell et al., 2020), student engagement (Chierichetti & Backer, 2021), teacher-student interaction and role of technology (Blundell et al., 2020). According to Grunwald and Peterson (2003) faculty satisfaction with student assessment at their institution is a rating of their satisfaction with the institution's assessment methods, policies, administrative leadership support, professional development opportunities and decision-making patterns for student assessment and is significantly predicted by institution-wide support patterns (the total variance explained for satisfaction with the institutional approach to student assessment was 39%). In this regard, it is worth mentioning that the observed high satisfaction levels in our study could be related to the institutional support of online assessment practices provided to faculty such as guidelines, handbooks and FD training. Moreover, one of the prominent practices was to formulate the OEC for managing remote online exams in all colleges which engaged senior managers and faculty in planning and implementing online assessment practices at their colleges. Such engagement was viewed by scholars as enhancing problem-solving (Sharabi, 2013), decreasing resistance to change (Elassy, 2015) and leading to significant changes (Brown, 2011). This makes it easy to shift to online assessment practices and might relate to high levels of faculty satisfaction with the institutional practices, accordingly (Abduh, 2021; Bdair, 2021; Kundu & Bej, 2021).

Additionally, the study results pinpointed the challenges encountered, best practices and recommendations for improving online assessments. HEIs had to abruptly shift learning and teaching, including student assessment practices from face-to-face to online mode to maintain achieving the desired LOs due to the COVID-19 pandemic. It has been observed that during the transition, studies have reported that the rapid transformation to online education includes various obstacles and challenges (Crawford et al., 2020) and online assessment proved to be the most challenging aspect (Meccawy et al., 2021) particularly for faculty and students. The present results revealed that faculty members faced challenges when assessing students online including training which could be attributed to the view that faculty members displayed significant gaps in comfort levels with the use of basic technology required to shift to online instruction and assessment (An et al., 2021) as well as the design of online tests (Montenegro-Rueda et al., 2021). Furthermore, Rapanta et al. (2020) emphasized that academics who taught in traditional face-to-face environments during the initial weeks of 2020 were unlikely to be familiar with online practices and digital tools. Training for technological tools in teaching and learning depends on the accessibility and availability of technologies (Bawaneh & Malkawi, 2023). Moreover, replacing face-to-face education with online education increased demands and requirements with faculty admitting to being "pushed over the limit" (Jankowski, 2020) and needed time and effort to redesign the entire teaching and learning process, including assessment practices (García-Peñalvo, 2021). Furthermore, using appropriate online assessment methods to assess learning and learning loss was challenging. Similarly, previous studies reported faculty concerns regarding inaccurate measures of learning during the pandemic, decreased academic standards (Jankowski, 2020) and difficulty in assessing learning goals online as this required additional faculty training (Alruwais et al., 2018).

Furthermore, this study revealed that the best practices employed by faculty members included using available online assessment tools, ease of providing student feedback, using online assessments for formative purposes, training students regarding using online assessments, assessing higher-order thinking skills (HOTs), focusing on student participation and aligning online assessment with CLOs. This finding could be explained by the view that the online mode of delivery entails innovation and modification of instructional materials, teaching methods and assessment techniques activated by institutional policies (Liguori & Winkler, 2020). It also aligns with previous studies showing that online assessment improves the quality of student feedback, helps track students'

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performance, analyzes results across many assessments and enhances learning levels (Alruwais et al., 2018; Meccawy et al., 2021). Moreover, online assessment helps in the achievement of educational goals by assessing higher-order thinking skills such as critiquing, reflection and problem-solving rather than memorization (Alruwais et al., 2018; Jankowski, 2020). Additionally, our sample reported the use of online assessment through the learning management system (LMS) and blackboard as one of the best practices. This finding conforms with other Saudi universities that used blackboard as an LMS several years before the pandemic (Al-Samiri, 2021). Additionally, this finding supports that our university provided training to enhance online teaching and assessment using blackboard including analyzing test results, grading practices, using effective rubrics and providing constructive feedback (Almahasheer et al., 2022). Training for technological tools for teaching and learning depends on the accessibility and availability of technologies (Bawaneh & Malkawi, 2023).

Lastly, faculty members recommended additional training, tutorial videos and exemplary online assessment tools. This was consistent with previous studies that reported that faculty members expressed the need for more training with regard to using online assessments (García-Peñalvo, 2021; Meccawy et al., 2021) and developing online formative and summative assessments to measure student learning outcomes (An et al., 2021). It has been suggested that assessment was divorced from teaching and learning during the COVID-19 pandemic and training focused on online instruction and technology rather than assessment and learning (Jankowski, 2020). Moreover, An et al. (2021) reported that workshops or instructional videos should be developed for students to help complete assessments in online environments. For IAU faculty, raising awareness, developing guidelines and disseminating flickers and digital fliers on online assessment were not highly recommended which further suggested high faculty awareness regarding university assessment practices during the pandemic.

6. Conclusion

The closure of HEIs due to the outbreak of the COVID-19 pandemic prompted numerous endeavors and adaptations to online learning and assessment as a promising solution. In this study, we analysed the Saudi faculty experience in terms of awareness, satisfaction, encountered challenges, best practices and recommendations for improving online assessment. It was observed that faculty have high levels of satisfaction and awareness of IAU online assessment practices. Faculty development training is primarily recommended to assess learning outcomes accurately in the online modality. Interestingly, available tools in the LMS during the era of COVID-19 enabled student feedback provision. The study concluded that the gateway to high levels of faculty awareness and satisfaction during emergencies is providing institutional support through issuing policies, guidance, assessment resources, faculty development training and faculty involvement in implementing online assessment measures and practices. The study findings implied that institutional preparedness pronounced by the active utility of the available technological resources (LMS tools) facilitated the abrupt transition into online assessment mode. Notably, the study pointed out the need for more faculty development opportunities and digital resource availability regarding online assessment practices to bridge the gap between conceptions and practices in the post-COVID-19 era.

7. Implications, Limitations and Future Research

The study findings imply the necessity of a comprehensive strategy for online assessment that includes institutional support, faculty development opportunities, technological readiness, digital tool investment and research on student-centered practices. Such a strategy is crucial for maintaining the integrity and efficacy of teaching and learning practices during emergency transitions. Moreover, these ramifications can help HEIs improve their online assessment practices which will improve e-learning overall and help students succeed in the post-COVID-19 era. On the other hand, this study has three potential limitations. The first concerns the recruitment of study participants from a single tertiary setting in Saudi Arabia which confines the generalizability of the results to institutions of similar size and location. Second, the study relies on self-reported data using a questionnaire, thus producing subjective information. Accordingly, we view that future studies using a mixed-methods design may provide an in-depth analysis of online assessment changes during the COVID-19 pandemic in different contexts. Third, the participants were recruited through convenience sampling, so we had to report only those who completed the questionnaire. Thus, it is recommended to extend the sample size in future studies. Despite these limitations, this research can be seen as a first step that enhanced our understanding of the faculty experience of online student assessment practices during emergencies that to our knowledge have not been examined particularly in the Saudi context and we hope that the current research will stimulate further investigation of this important area. Finally, despite these limitations, this study opens a novel avenue for exploring faculty experiences with online assessment particularly within the Saudi educational landscape, thereby enriching the global dialogue on adapting to emergency online learning.

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Appendix

Appendix 1 presents the questionnaire that was developed for the study. The questionnaire includes four main sections. The first section regarding demographic information (academic cluster, gender, and educational level). The second section includes six items assessing the participants' awareness regarding university guidelines for student assessments during the COVID-19 pandemic. The third section comprised 12 items assessing academics' satisfaction levels with the university assessment practices during COVID-19. The fourth section included multiple-response questions that addressed the challenges, best practices, and recommendations for improving online assessment practices during the COVID-19 pandemic.

Appendix 1. Questionnaire of faculty experience of online assessment practices in IAU during COVID-19.

Section I: Demographic information.
1- Academic cluster: Health / Science and management / Engineer/ Art and humanities
2-Gender: Male / Female
3-Educational level: TA / Assistant professor / Associate professor / Professor
Section II: Please select the number that best describes your awareness of the university online assessment practices during COVID-19 (*2= I am fully aware of, 1= I am partially aware of, 0= I am not aware of).*
1-The university guidelines and announcements on student assessment and grading for the online mid-term exams.
2-The university guidelines and announcements on student assessment and grading for the online final exam.
3-The frequently asked questions (FAQ) manual for the assessment and procedures of the remote online exams issued by the QA center.
4-The checklist for quality review of online exams (Mid-term and final issued by QA center).
5-The committee for OEC formulation at my dept. / college regarding the final exam.
6-An adequate support from OEC when I faced any challenge while administering online exams.
Section III: Please select the number that best describes your satisfaction with the university online assessment practices during COVID-19*(4=Totally satisfied, 3=Satisfied, 2=Dissatisfied, 1=Totally dissatisfied)*
1-The university promptly responded to COVID-19 by issuing new effective policies and procedures for student assessment.
2-The university guidelines for student assessment during COVID-19 were easy to apply.
3- The used online assessment tools assessed all course learning outcomes.
4-The used online assessment tools during COVID-19 helped me rapidly obtain my students' results compared to the assessment tools in direct instruction.

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5-The used online assessment tools during COVID-19 considered the needs and tendencies of the students in the digital era compared to the assessment tools used in direct instruction.
6-The online assessment methods allowed students to effectively participate in the assessment process compared to the assessment methods used during direct instruction.
7-The online assessment methods allowed for showing individual differences among students compared to the assessment methods used during direct instruction.
8- The online assessment methods used kept up with the Kingdom and the international digital transformation trends compared to the assessment methods used during direct instruction.
9-The use of online assessment tools during COVID-19 enhanced self-learning skills as compared to the assessment tools used during direct instruction.
10-The use of online assessment tools during COVID-19 saved time and effort compared to the tools used during direct instruction.
11-The use of online assessment tools during COVID-19 reduced exam anxiety as compared to the use of assessment tools during direct instruction.
12- Overall, I view online assessment tools as a positive experience.
SectionIV:
1-Which of the following is considered a challenge that you faced in COVID-19 (You might check multiple boxes):
□The need for more training on using e-assessment tools □Lack of guidebooks □Need for more tutorial videos □Inappropriateness of available tools to assess all course learning outcomes □Lack of developing item banks □Require lots of time and efforts □Lack of resources and readiness (e.g., internet...) □Loss/gap of learning outcome assessment □Other (Please mention)
2-Which one of the following practices did you use during COVID-19 and proved to be efficient? (You might check multiple boxes):
□Using e-assessment as formative purposes and enhancing students' learning □Training students on using e-assessment tools □Easiness of giving feedback to students □Focus of e-assessment on students' participation □Alignment of e-assessment tools with the course learning outcomes as in the assessment plan □Employing the available e-assessment tools in BlackBoard □Assessing higher order thinking skills □Other (Please mention)
3-Do you have any recommendations for developing the e-assessment methods in the future?
□Providing training workshops □Developing procedural guides □Developing guidebooks □Disseminating flickers on e-assessment □Designing tutorial videos □Developing models of e-assessment tools □Other (Please mention)

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