

International Journal of Learning, Teaching and Educational Research
Vol. 22, No. 9, pp. 442-462, September 2023
<https://doi.org/10.26803/ijlter.22.9.24>
Received Jun 14, 2023; Revised Sep 27, 2023; Accepted Oct 3, 2023

Changes in Assessment Modality in Saudi Higher Education: Lessons Learnt Post-COVID-19

Wessam Mohamed 

Centre for Quality of Assessment and Examinations, Vice Presidency Office for Academic Affairs, Imam Abdulrahman Bin Faisal University, Dammam, KSA

Taghreed Abdulaziz Almuqayteeb* 

College of Education, Imam Abdulrahman Bin Faisal University, Dammam, KSA

Abstract. This article examines the changes in academics' assessment practices, the contributing variables in response to the transition to the online modality during the pandemic, and the most important 21st-century skills that academic programs should assess post-COVID. The study used a descriptive methodology with both quantitative and qualitative analyses via survey-based research. A total of 225 faculty members from different academic clusters, of different educational levels, genders, and assessment-related work experiences completed the questionnaire. The findings of this research identified interesting shifts in the academics' assessment practices upon 100% transition to the online modality. Specifically, most of the academics modified their assessment plans by lowering the workload of assessment tasks while retaining the same assessment methods. Additionally, a higher weightage of marks was allocated to the use of alternative/ authentic assessment. There was a noticeable increase in the employment of online assessment methods such as examinations, oral exams, assignments, and participation. Furthermore, both the academic cluster and course type had impacts on the utilization of online assessment methods. Lastly, the study identified critical thinking and problem-solving skills, information and computer technology-related skills, and creativity as the top skills to be assessed post-COVID-19. By examining the academics' assessment practices in response to the complete transition to the online modality, this research contributes to the sustainability of best practices in online assessment modalities in higher education. Finally, this study provides recommendations for academics: collaborative assignments, valued as a high-impact assessment practice, should be used to embed and sustain learning. Additionally, academics should be encouraged to adopt authentic assessment methods for online assessment.

*Corresponding author: *Taghreed Abdulaziz Almuqayteeb; talmuqayteeb@iau.edu.sa*

©Authors

This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (CC BY-NC-ND 4.0).

Keywords: post-COVID-19; changes; assessment modality; quality; authentic; higher education

1. Introduction

The onset of the COVID-19 pandemic sent profound shock waves through the entire higher education system on a global scale (Johnson et al., 2020). As an immediate response, Higher Education Institutions (HEIs) closed in most countries and migrated to remote instruction (Jankowski, 2020) to address the pressing need to keep progressing education (Abduh, 2021; Meccawy et al., 2021; Montenegro-Rueda et al., 2021; Rahim, 2020). Assessment was also severely impacted by these closures and, as a consequence, underwent significant transformation (Khodamoradi et al., 2022) as a central element of the teaching and learning process. Several researchers reported changes observed in student assessment due to COVID-19. These changes included shifting the focus from written exams to a variety of assessments formats such as written assignments, online discussions, presentations, group work, and e-portfolios (Hodges & Barbour, 2021; Chen et al., 2022).

It has been reported that the factors associated with the urgent need to transform assessment for the online environment were tied to the challenges facing HEIs more generally (Rapanta et al., 2020). It has also been reported that the design of online assessment, the issuance of guidance (Rahim, 2020), and the implementation of technology in the new assessment environment (Abduh, 2021) have been the most challenging areas to cope with. Researchers also noted other challenges, such as risks to the authenticity and academic integrity of students' performance in online assessments (Meccawy et al., 2021), and, as noted by faculties, the fact that online assessments add to their workloads (Al-Samiri, 2021). Additionally, the absence of physical interaction left educators with limited options for assessing their learners online, leading to the risk of facing the after-effects of poor assessment. As a solution, the sudden transition to an online assessment mode entailed a re-examination of assessment practices and the adoption of new digital academic experiences by educators and students (Lederman, 2020).

Previous studies have shown that in response to the 100% transition to the online assessment modality, academics in HEIs altered their assessment practices to resolve challenges and issues they encountered at this point in time. However, only a handful of studies have deeply analyzed academics' assessment practices and the variables that impacted these changes to reflect on the sustainability of good practices in the post-COVID period. Hence, the primary motivation of this study is to analyze in depth the changes in academics' assessment practices in response to the complete transition to the online modality, determine the impact of several demographic variables on these changes, and rate the top skills that HEIs should be teaching post-COVID. Finally, we will reflect on lessons learnt for sustaining effective online assessment practices in the post-COVID period in the broader context of HEIs other than the Saudi context. Therefore, the research questions are:

RQ1: What changes were observed in academics' assessment practices in response to the transition to the online mode?

RQ2: What variables have significantly impacted academics' use of an online assessment format in the during-COVID period?

RQ3: What are the most important 21st-century skills that academic programs should assess post-COVID?

2. Literature Review

2.1 Assessment Pre- and Post-COVID

In response to the pandemic, plenty of studies have uncovered evidence of the adjustment of different online assessment formats and distance alternatives by academics (Fergus et al., 2020; Gao et al., 2020; Hodges & Barbour, 2021; Johnson et al., 2020; Pather et al., 2020). For example, Johnson et al. (2020) documented changes in faculty assessment practices due to the shift to the new online mode of delivery as evidenced in reduced student workload. This included cancelling assignments and exams and postponing or replacing them with alternative assessment methods and online assessment tools (Burgess & Sievertsen, 2020). In Slade et al.'s study (2022), results demonstrated that 90%, of course coordinators retained their original assessment schedule but delivered it online. Additionally, academics shared that the most frequently used assessment formats included projects, oral exams, videos, presentations, case studies, etc.

Moreover, they used ZOOM for individual and group assessments to alternate with traditional exams (Slade et al., 2022). They also reported that specific online assessments (such as projects, case studies, oral exams, etc.) were retained and highly valued based on disciplinary learning outcomes. Unsurprisingly, assessments related to practical domains were modified to focus more on an online assessment of the process than hands-on skills (Slade et al., 2022). Within the context of the pandemic, Chen et al. (2022) conveyed that the most frequently mentioned modifications involved moving paper and in-person submissions to an online format. They ascertained that although the format of all assessment methods changed from paper to digital, the content of the assessments remained the same (Chen et al., 2022).

Furthermore, previous research identified some factors that affect faculty assessment practices. In Almosa et al. (2022) study, the authors found that academic rank and years of experience influence faculty assessment practices. They reported that lecturers and teaching assistants had different and more educational requirements for assessment than did more experienced faculty members (Almosa et al., 2022). Additionally, Coombs et al. (2018) found that experienced teachers are more likely to have more thorough assessment expertise as they gain knowledge over time.

To conclude, critical changes occurred in educators' assessment practices while retaining the content of the assessment forms. This involved delivery in an online format, lowering the assessment workload for teachers and students and replacing traditional assessment with alternative online methods, such as projects, group work, oral exams ...etc. Since 2020, several attempts have been

made to determine what changes occurred and to pinpoint the uncertainties due to the sudden shift from face-to-face (f2f) assessment to the online format during the pandemic (Hatzipanagos et al., 2020). Concerns have been expressed about the sudden change to an entirely online format without guidance regarding the quality of online assessment. In response to this issue, Rahim (2020) proposed guidelines for designing online assessment. Notably, he highlighted the need to align assessment activities constructively with stated learning objectives, addressing assessment validity threats, and ensuring the quality of online exams via blueprints, formats, and schedules (Rahim, 2020).

2.2 Inclusion of 21st-Century Skills in Assessment

Rahim (2020) suggested stimulating student learning by including 21st-century skills and authentic learning. There have been growing concerns about curricula development and assessments related to 21st-century skills (Crosta & Banda, 2021; Huedo, 2021), including the abilities and attributes that can be taught or learnt to enhance thinking, learning, working, and living in today's world (Bakay, 2022). Knowledge, learning and innovation skills, information, media, technology skills, and life and career skills – also known as personal qualities – are among the crucial 21st-century abilities educators need to teach their students, according to the P21 Framework (Greenhill, 2010). The inclusion of 21st-century skills in assessment will help to prepare students for the evolving nature of the workforce in the 21st century (Byrne, 2022). Miller and Konstantinou (2021) emphasized that the pandemic drove this need to possess 21st-century skills such as thinking creatively, doing things differently from the past, and being more self-aware (Miller & Konstantinou, 2021). According to their survey, students believed that self-reflection on skill development and understanding the value of innovation and creativity abilities are essential for a post-COVID world where things won't revert to normal instantly. Therefore, authentic, problem-based assessment, and explicit skills development are needed to build students' employability and future skills, and this necessitates various assessment formats to measure 21st-century skills post-COVID-19 (Soland et al., 2013). In summary, new assessment approaches are needed post-COVID-19 to empower students to develop the necessary skills for their future work.

On top of this, as academics had to tackle rapid changes in the assessment modality to accomplish pre-set Learning Outcomes (LOs), online assessment proved to be the most challenging element of the switch to online learning (Meccawy et al., 2021). To clarify, researchers have raised concerns regarding threats to the academic integrity and authenticity of students' work while assessing them in the online mode. Consequently, this amplified ongoing discussions about students having more opportunities to cheat in the online environment, especially in online exams. As a solution, researchers recommended the use of alternative and authentic assessment methods since they hold promise for measuring student learning outcomes and reducing dishonesty (Farrell, 2020; Xie et al., 2021). Additionally, researchers shared some practices for online invigilation and/or proctoring systems (Chen et al., 2022; Farrell, 2020) or the introduction of online oral examinations (Akimov & Malin,

2020). For instance, Farrell (2020) highlighted several good practices to verify the academic integrity of assessment, including the creative design of authentic assessment methods, moderation of marking, text-matching software, and oral exams and vivas. The latter has been recognized as a workable option to embed authenticity, with evidence that interactive orals can help prevent academic misconduct (Sotiriadou et al., 2020). Chen et al. (2022) added the use of the LockDown Browser or open book exams as solutions to academic misconduct while assessing students online. To summarize, the academic integrity and authenticity of students' performance represents a concern which has prompted changes in assessment practices by academics in response to the complete transition to the online format.

3. Methodology

This study is quantitative through the use of a self-reported survey. The descriptive study is a part of a larger examination of how academics have responded to COVID-19 in terms of assessment practices. The study's underlying motive is that people have various perspectives on teaching and learning that are socially constructed based on their experiences and worldviews and collected from numerous university educators at a complex moment in time (Slade et al., 2022).

3.1 Study Context

The study was carried out at a mid-sized university in the Eastern Province of Saudi Arabia. The urgent need to switch to a "work-from-home" model and a totally remote learning mode increased after the Saudi Ministry of Health (MOH) declared the first positive case of COVID-19 on March 2, 2020 (Al-Samiri, 2021). Accordingly, the Ministry of Education (MOE) adjusted to the rapid changes by publishing a guidebook for university-level examinations and assessment during the pandemic. It recommended the use of various online alternative assessment methods such as assignments, projects, presentations, posters, portfolios, oral, open book exams, and discussion boards (MOE, 2020a), in addition to the use of online multiple-choice questions (MCQs) and essay questions for summative assessment purposes (MOE, 2020b). In alignment with the Saudi MOE guidebook, the institutional response at Saudi universities was to issue guidelines for online assessment. They were circulated through different communication channels to enhance and ensure their quality and academic integrity. Notably, the guidelines included opportunities to adjust and re-weight the summative assessment plans. In reality, most Saudi universities were naturally prepared for this kind of adjustment several years prior to the pandemic due to their use of Blackboard resources as a Learning Management System (LMS) to deliver online courses and online learning and assessment (Al-Samiri, 2021). On top of that, the university which is the focus of this study had unique experience of utilizing an item banking platform, QuestionMark®, one semester before the pandemic, which facilitated the need to use an online platform to deliver secured end-of-semester examinations.

3.2 Participants

The target population of this study was faculty members in a mid-sized Saudi university (N=3027) in the Eastern Province, belonging to four academic clusters. Participants were voluntarily recruited via email invitation through established networks (emails and WhatsApp groups) which included a link to access the online survey. They were selected through non-probability, convenience sampling (Martínez-Mesa et al., 2016). Out of 300 respondents, 225 participants completed the online survey from all four clusters, including health (26.2%), engineering (7.6%), science and management (28.9%), and arts & education (37.3%). Of all the participants 62.7% were female and 61.8% had obtained a PhD. However, only 37.3% were involved in assessment-related work experiences by being heads of either units or committees for the quality of assessment and examinations at their colleges. A cover page describing the study aims was included in the survey. By completing the survey, participants agreed to the use of their data only for the purposes of research. This was taken as informed consent.

3.3 Instrument

The current survey is a part of a larger structured self-reported survey that aimed to gauge academics' experience of student assessment practices pre- and during-COVID-19 (Almuqayteeb & Mohamed, forthcoming) as an appropriate strategy for collecting quantitative data (Creswell, 2014). The survey was developed, face and content validated by ten experts in education and student assessment. We asked them to judge the clarity of the items' wording, appropriateness, and relevance to the assessed construct. Reviewers suggested that items investigating the changes in assessment in pre-during COVID in this study should be presented in a multiple-response format rather than an open-ended format for easier, more valid interpretation of results and reliable coding of responses. Therefore, this recommendation was incorporated in the refined version. Further, reliability was computed using Cronbach's alpha coefficients for different sections and the values ranged from .88 to .94 indicating a high level of internal consistency.

The revised survey, as reported in this study, comprised four main sections. The first section collected demographic and course information (academic cluster, gender, educational level, and assessment experiences related to workplace, course delivery mode and course type/components). The second section involved multiple-response questions on academics' assessment practices pre- and post-COVID-19, including, the assessment plan, online format of assessment methods, and online platforms utilized. The third section included single-select or fill-in-the-box items to collect data on the online final examination. The fourth section included one open-ended question to collect data on 21st-century skills which should be measured post-COVID ("In your opinion, which are the most significant 21 century skills that your academic program should assess as a requirement for the graduate after COVID -19: please, mention the most three significant"). Reliability of responses was coded and reported (see below, Section 4.2. Analysis Techniques). Then, a pilot test of the final version was run with a small group of faculty members to ensure the readability of the survey items. Finally, the survey was facilitated through QuestionPro® and delivered

online, as a cost-effective method (Wright, 2017). This enabled systematic and comparative data capture (Slade et al., 2022), especially during lockdown periods. Multiple methods such as a following up the circulation amongst faculty members by all possible means of communication, namely, emails and formal WhatsApp groups, were adopted to boost the online survey response rate (Nulty, 2008). Data were collected from September to December 2020.

3.4 Analysis Techniques

Data were analyzed using the IBM SPSS 26 Package by applying descriptive statistics to report changes in the academics' assessment practices (RQ1). Inferential statistics, namely, One Way Analysis of Variance (ANOVAs), were employed to examine the impact of demographic variables on the online assessment format (RQ2). To answer RQ3, all textual responses to the open question were qualitatively analyzed following inductive thematic and content analysis protocols (Kiger & Varpio, 2020; Saunders et al., 2007). First, the researchers familiarized themselves with the entire data set. Then, responses were sorted out, and irrelevant responses were omitted from the analysis. Initial codes were generated for the textual data, and the Battelle for Kids P21 was adopted as a theoretical framework (Greenhill, 2010) to create and organize the central themes and their categories. Then, the content-related themes in each textual unit were coded with reference to P21, in order to ensure that themes were easily identifiable. Following this, the researchers reviewed the initial list of themes and categories, and by iteration and negotiated consensus classification for the working list, the reliability of the coding was determined (Kiger & Varpio, 2020). Following all the data coding, the researchers went over about 30% of the 148 randomly chosen textual examples once more. After the last reporting, the qualitative analysis was completed by carefully examining the written responses (Saunders et al., 2007).

4. Results

It is worth noting that before the pandemic, participants reported that 152 (67.6%) of the courses were delivered face-to-face, while 58 (25.8%) were delivered in a blended format, and only 15 (6.7%) were delivered in an online mode. Further, courses varied in terms of their components, falling into three main categories: 118 (52.4%) theoretical, 11(4.9%) practical, and 96 (42.7%) courses with both theoretical and practical components.

RQ1: What changes were observed in academics' assessment practices in response to the transition to the online mode?

Upon shifting to 100% online instruction, academics were allowed to change and adapt their course assessment plan. In response to RQ1, results of the self-reported survey indicated that the majority of academics (64.3%) opted to modify their assessment plan, while 35.7% retained the same plan for their assessment from before the pandemic with an adaptation to the online format. Further investigations of their pre-and during-COVID assessment practices indicated strong evidence for a general tendency towards reducing the number of assessment tasks, as shown by the declining number of academics' responses, from 967 academics' responses in the pre-COVID condition to 540 responses in

the during-COVID condition which articulates the frequency of the assessment tasks.

Additionally, it is apparent that in both the pre-and during-COVID conditions, academics frequently included traditional assessment, such as examinations (final and mid-) and quizzes, in their assessment plan. However, their frequency dropped in the latter condition. Also, in during-COVID, there was a shift towards using assessment methods other than traditional assessment, like assignments, practical, clinical, and oral exams...etc., known as alternative assessment methods (Figure 1). This was confirmed by a paired-sample t-test to compare the marks allocated for the alternative assessment methods in pre-and during-COVID conditions.

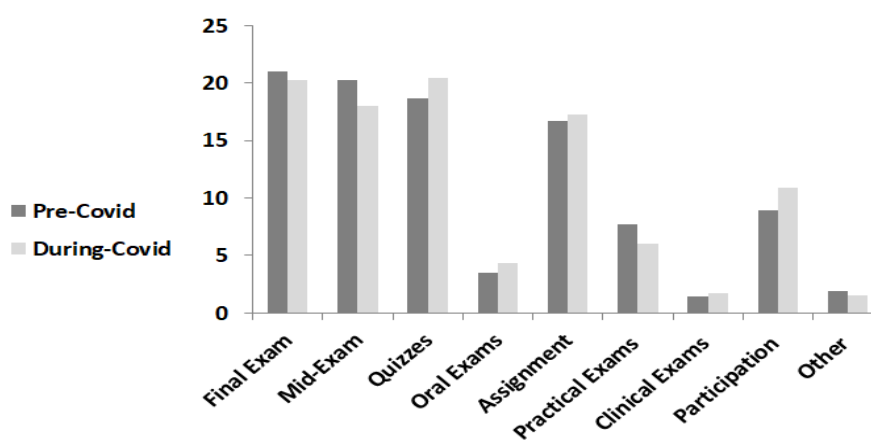


Figure 1: Change in described frequency percentage % (N = 225 academics) for a variety of assessment methods in response to the transition from a face-to-face to an online mode

The results showed a significant difference in the marks allocated for alternative assessment methods for the during-COVID condition ($M=38.7$, $SD=23.1$) compared to the pre-COVID condition ($M=32.4$, $SD=19.8$). This implied that academics significantly preferred to include more alternative methods in their modified assessment plans and changed the weighting of the assessment by allocating more marks to alternative assessment methods. Moreover, academics reported on their use of an online assessment method format (Figure 2) in pre-and during-COVID conditions. Data indicated an increase in the use of the online format for assessment methods by academics during-COVID, particularly for online examinations (final and mid-) compared to the quizzes. Interestingly, assessment tasks that required more interaction and involvement dropped in frequency, as shown by the practical exams. On the other hand, there was a tendency to use alternative assessments such as oral exams, as their frequency increased rather than being removed from the assessment plan. Surprisingly, using assignments in the online format slightly decreased during-COVID. Overall, these findings demonstrate that the academics were familiar with using the online assessment format pre-COVID, but the frequency with which they used specific assessment methods in their courses increased.

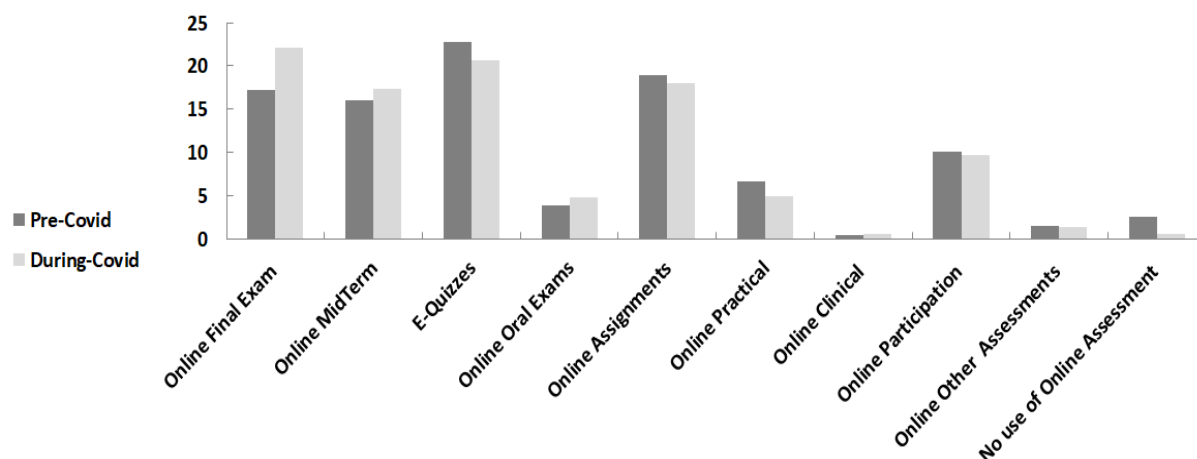


Figure 2: Change in reported frequency percentage % (N = 225 academics) for various assessment methods using the online format

Additionally, changes in the frequency of use of the different platforms for online assessment were examined (Figure 3). Pre-COVID, quite a few courses were delivered either using a blended or online mode in the university through Blackboard as shown by its highest frequency. In contrast, during-COVID assessment practices showed an increased frequency in using a variety of other platforms such as QuestionMark, ZOOM, etc. The increase in the use of ZOOM is in line with the increase in the use of oral exams during-COVID as this was the default platform at the university under study for this type of assessment.

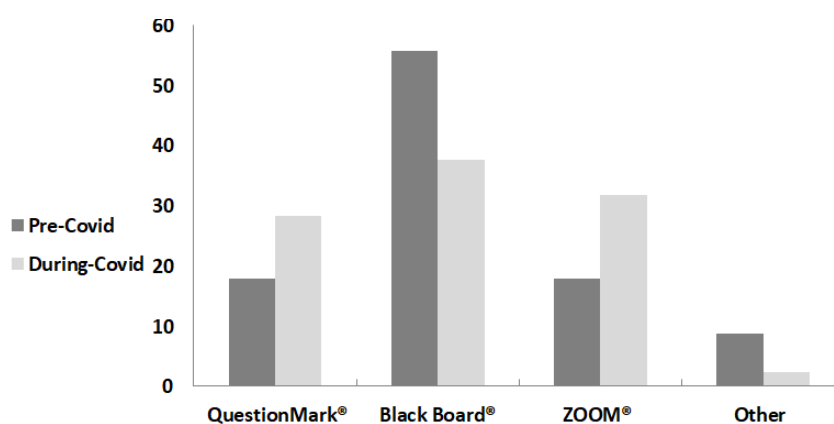


Figure 3: Change in reported frequency percentage % (N = 225 academics) for a variety of assessment platforms

Furthermore, we investigated changes in the academics' practices concerning the final written exams during-COVID. Descriptive data demonstrated that the average duration for the final online exam was 58.5 minutes for an average of 31 questions. Of all the final exams, 72.1% included only MCQs; 5.8% included only essay questions, and 22.1% included both MCQs and essay questions. Additionally, academics reported different difficulty levels for the final written exams which they developed; 91.3% of the final exams were moderate, 4.3% were difficult, and 4.4% were easy exams. Moreover, the platforms used for delivering final written exams were reported on with the following results:

54.1% were created in QuestionMark®, followed by Blackboard® at 39.6%, ZOOM® at 3.9%, and other platforms at 2.4%. Finally, as per the university guidelines for ensuring the quality of online exams, the survey results indicated that most academics (92.3%) complied with the guidelines, while only 7.7% did not follow them. This confirmed that the transition to the online assessment format did not affect the assurance of quality for the online exams delivered to students during-COVID.

RQ2: What variables have significantly impacted academic's use of an online assessment format in the during-COVID period?

To answer this question, we computed the frequency of all the online format assessments used by academics in each course. We examined the impact of demographic variables such as academic cluster, gender, educational level, and assessment-related work experiences. First, the findings of the ANOVA (Table 1) showed a significant effect of academic cluster at the $p < .01$ level. [$F(3, 188) = 5.9$, $p = 0.01$, $\eta^2 = 0.059$]. Post hoc comparisons using the Tukey HSD test indicated that both the mean score for the science and management cluster and the mean score for the arts and education cluster were significantly different from the health cluster, while the engineering cluster did not significantly differ from any academic cluster.

Table 1: Means, Standard Deviations and One-Way Analyses of Variance in online format assessment during-COVID

Health		Science and Management		Arts and Education		Engineering		F (3,188)	η^2
M	SD	M	SD	M	SD	M	SD		
3.1	1.1	4.2	1.4	3.8	1.2	3.3	1.1	5.9*	0.059

* $p = .01$, $\eta^2 = 0.06$ indicates a medium effect

Examining the effect of gender on the use of online assessment formats (Table 2) by calculating an independent-samples t-test showed no significant difference in the use of online formats between males and females; $t(198) = 1.8$, $p = 0.069$. These results suggest that gender did not affect the use of online assessment formats during-COVID.

Table 2: T-test comparing male and female use of online assessment formats post-COVID

Use of online format assessment post-COVID	Male		Female		t (198)	p
	M	SD	M	SD		
	3.7	1.2	3.4	1.6	1.8	.069

To test the effect of the educational level, an independent-sample t-test was conducted to compare the use of online assessment formats by academics who had obtained a PhD and those who were educated to Master's (MA) and Bachelor's (BA) level during-COVID. The results indicated no significant

difference in the use of online formats among academics who had obtained a PhD and those who had obtained an MA and BA; $t(198) = 0.3$, $p = 0.74$, suggesting no effect of educational level on the use of online assessment formats during-COVID (Table 3).

Table 3: T-test comparing academics with PhDs and those with MAs & BAs on the use of online assessment formats during-COVID

Use of online assessment formats post-COVID	Obtained PhD		Obtained MA & BA		t (198)	p
	M	SD	M	SD		
	3.5	1.4	3.5	1.6		

Further, to scrutinize the effect of assessment-related work experiences (Table 4), an independent-sample t-test was conducted to compare the use of online assessment formats during-COVID by academics who had assessment-related work experiences and those with no previous experiences. The results indicated no significant difference in the use of online formats by academics with assessment-related work experiences.

Table 4: T-test comparing academics with and without assessment-related work experiences on the use of online assessment formats during-COVID

Use of online assessment formats post-COVID	Academics with assessment-related work experiences		Academics with no previous experiences		t (198)	p
	M	SD	M	SD		
	1.43	.0002	3.38	1.45		

Finally, we examined the effect of course type (theoretical, practical, both) on the use of online assessment formats by academics. The results of the ANOVA showed a significant impact of course type at the $p < .01$ level. [$F(2, 189) = 4.5$, $p = 0.01$]. Post hoc comparisons using the Tukey HSD test indicated that both the mean score for courses of the theoretical type ($M = 3.8$, $SD = 1.2$) and the "both components" ($M = 3.6$, $SD = 1.4$) type were significantly different than courses of the practical type ($M = 2.4$, $SD = 1.4$). Taken together, these results suggest that academics used more online assessment formats for both the theoretical courses and courses with both practical and theoretical components compared to courses with only a practical component during-COVID. To conclude, amongst the demographic variables, only the academic cluster and the course type significantly affected the use of online assessment formats by academics during-COVID.

Table 5: Means, Standard Deviations and One-Way Analyses of Variance for online assessment formats post-COVID

Theoretical Courses		Practical Courses		Both Components		F (2,189)	η^2
M	SD	M	SD	M	SD		
3.8	1.2	2.4	1.4	3.6	1.4	4.5*	0.045

* $p = .01$, $\eta^2 = 0.05$ indicates a small effect

RQ3: What are the most important 21st-century skills that academic programs should assess post-COVID?

To answer this question, the frequency percentage for each category of soft skills was computed, and the top skills were ranked according to their frequency. The final analyzed responses are represented by a concept map of the themes, categories, and sub-themes (Figure 4).

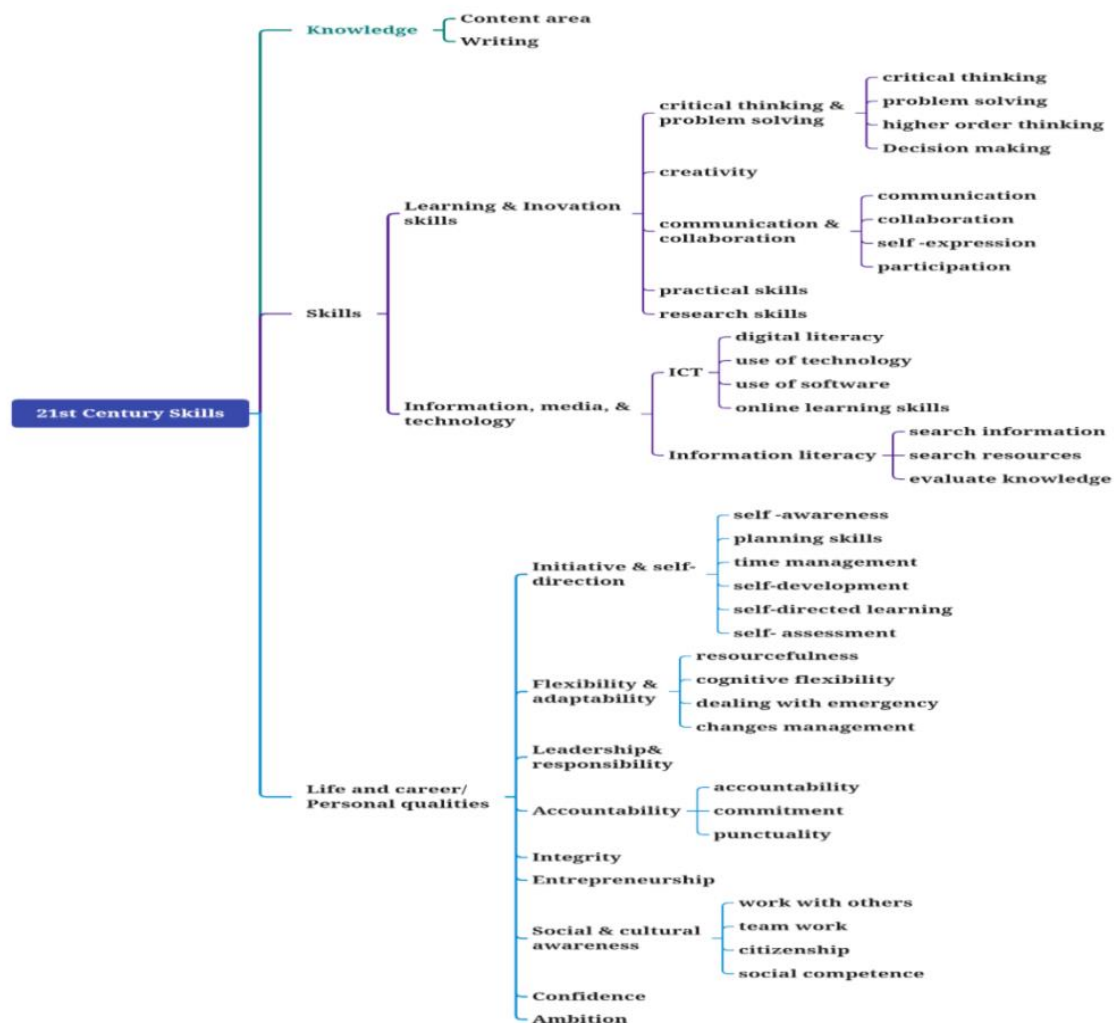


Figure 4: Concept map of the top 21st-century skills to be assessed post-COVID 19 as reported by academics

Moreover, data in Table 6 indicates the frequency percentage and rankings for each category skill as reported by the academics. The analysis yielded three main central themes that appeared in academics' responses to the open question: (1) knowledge, (2) skills, and (3) life and career qualities. Aligned with the P21 Framework, these central themes were used to categorize 21st-century skills. Surprisingly, both critical thinking & problem solving, and ICT skills were in first place, followed by creativity, as the most critical skills to be assessed post-COVID. Another significant finding is the importance of initiative & self-direction as a life and career quality to be assessed post-COVID. Further, information literacy and practical skills were reported to be key skills post-COVID. To conclude, academics reported learning & innovation skills and information, media & technology skills as essential 21st-century skills for academic programs to focus on and assess post-COVID.

Table 6: Top 21st-century skills as ranked by academics

Category	Rank	Responses%	Theme
Critical Thinking & Problem-solving	1	22.3	Learning & Innovation Skills
ICT			Information, Media & Technology Skills
Creativity	2	10.1	Learning & Innovation Skills
Communication & Collaboration			
Initiative & Self-direction	3	8.1	Life & Career / Personal Qualities
Information Literacy	4	4.7	Skills
Knowledge Related to Content Area	5	4	Knowledge
Flexibility & Adaptability			Life & Career / Personal Qualities
Practical Skills			Learning & Innovation Skills
Writing	6	2	Knowledge
Leadership & Responsibility	7	1.4	Life & Career / Personal Qualities
Integrity			
Accountability			
Research Skills	8	1.3	Learning & Innovation Skills
Social & Cultural Awareness	9	0.7	Life & Career / Personal Qualities
Entrepreneurship			
Confidence			
Ambition			

4. Discussion

Since online delivery of instruction became the new norm, assessment has also been impacted wholesale by institutional closures and as a consequence, it has undergone radical transformation (Khodamoradi et al., 2022). As a result, academics were required to adopt new digital academic approaches (Lederman, 2020) and accommodate these practices in their courses where relevant (Baxter & Hainey, 2023). Comparing the academics' assessment practices pre- and during-

Covid-19 demonstrated significant shifts in the assessment modality. In response to the emergent transition to the online mode, HEIs issued guidelines to academics to restructure the content and weighting of their assessment plans. Overall, this echoed the literature findings reporting academics' adaptation of different online assessment formats (Fergus et al., 2020; Gao et al., 2020; Hodges & Barbour, 2021; Johnson et al., 2020; Pather et al., 2020). First, it became evident that courses of all different types (theoretical, practical and both theoretical and practical) would need to be adapted for online assessment practices. In this regard, the results of RQ1 demonstrated that the academics at the university being studied had the opportunity to modify their assessment schedule in terms of the assessment methods utilized, their frequency and weighting. In line with other studies, the majority of academics shared that they had not altered the content of their scheduled assessment but instead had opted to translate their existing assessments into an online mode (Chen et al., 2022; Slade et al., 2022). Remarkably, there was a decline in the number of assessment tasks being postponed or dropped (Burgess & Sievertsen, 2020), which helped lessen the expected workload for instructors and students (Johnson et al., 2020). Accordingly, this resulted in a high educational impact from assessment as students could be adequately prepared for the assessment schedule (Schuwirth & Van der Vleuten, 2018). Moreover, this could be interpreted in line with the perceived lack of time to introduce new modes of assessment being "front heavy" for instructors (Weleschuk et al., 2019), especially given the disseminated measures and guidance by HEIs coupled with restrictive timelines for reformatting the assessment schedule (Slade et al., 2022).

Consistent with previous studies, the academics in this study pro-actively pivoted to include alternative and authentic assessment methods during -Covid as one of the innovative solutions to replace traditional assessment methods. This could be interpreted as evidencing the pressing need to boost the academic integrity opportunities for students' performance in the online assessment (Burgess & Sievertsen, 2020; Slade et al., 2022). Accordingly, more authentic tasks needed to be included in the modified assessment plans, resulting in a significant increase in the weighting of the alternative assessment and the allocated marks for this type of assessment in the during -Covid condition. As evidence, academics reported using interactive oral exams, assignments: projects, portfolios, videos, and presentations among other things. Further, academics have continued to employ this practice and it appears to be being maintained as the "new norm" as it ensures not only the authenticity of students' performance and their participation (Gikandi et al., 2011; Slade et al., 2022), reducing dishonesty (Farrell, 2020; Xie et al., 2021), but also assesses their mastery levels for skills other than the memorization of content. Zilvinskis (2015) added that organizations such as the National Institute for Learning Outcomes Assessment (NILOA) value specific authentic assessment practices such as electronic portfolios, common analytic rubrics, and online assessment communities as being high-impact practices (Zilvinskis, 2015).

Like other Saudi institutions, the ownership of an LMS contributed to the preparedness of the university in this study for the sudden transition to the

online mode of assessment. The academics had prior experience in online and blended environments and using LMS and platforms for online examinations and item banking to scaffold them which allowed them to easily adapt their assessment practices to the online modality. This was supported by the high-frequency use of Blackboard by academics which could be interpreted as demonstrating their satisfaction with its ease of use (Almahasheer et al., 2022) and the tools it makes available for plagiarism detection (Montenegro-Rueda et al., 2021). As for the frequent use of ZOOM as a platform by the academics in this study, this could be interpreted as demonstrating the accessibility of the platform for broadcasting and recording lectures (Almahasheer et al., 2022). Moreover, ZOOM was used as a medium for delivering online interactive oral exams, which allowed authenticity in online environments to be maintained and could help prevent academic dishonesty in assessments (Akimov & Malin, 2020; Farrell, 2020; Sotiriadou et al., 2020). Moreover, QuestionMark as a platform enabled academics to use the LockDown Browser as a creative solution to issues relating to academic misconduct while assessing students in online examinations (Chen et al., 2022). Concerning the final exams, academics' assessment practices showed that they consistently complied with the guidelines for assuring the quality of online examinations in terms of blueprints, formats, duration, and design before delivering them online (Rahim, 2020).

Further, we explored the impact of several demographic variables on the use of the online format for assessment methods. Since the occurrence of the lockdown, academics had been asked to respond instantly to the full transition to the online modality in all courses (Slade et al., 2022). Interestingly, only the academic cluster and the course type significantly impacted the frequency of use of online assessment formats. Such variables were related more to the learning outcomes rather than variables relating to the academics themselves. Insights to interpret these results could be contributed by the role of discipline-related learning outcomes and their assessment as academics were requested to translate their assessment activities into online formats. In their study, Slade et al. (2022) pinpointed that academics from science and engineering disciplines translates their practical assessment activities into the online mode. They focussed on the "process skills" rather than the demonstration of "hands-on skills", representing a position of shared understanding in practice about the emphasis in assessment. Since we reported the differences in the frequency of use of a variety of online assessment methods, it was evident that the disciplinary outcomes in both the practical courses and health discipline courses were not fully assessed using the available online formats for assessment methods or that the focus was more on the hands-on skills rather than the process skills.

Finally, our academics reported the vital 21st-century skills which should be measured by HEIs post-Covid. Interestingly, critical thinking, problem-solving, ICT, creativity, communication, collaboration, and self-direction were ranked as the top skills. Therefore, in the "new norm" learning environments, more focus needs to be directed towards instructing and assessing these skills by educators and on supporting students to master them. On the one hand, these results align with what Rahim (2020) assumed about the importance of stimulating student

learning by including 21st-century skills and authentic learning. Also, embedding 21st-century skills in higher education assessments will help to prepare students for the changing world of work in the 21st century (Byrne, 2022). Miller and Konstantinou (2021) added that COVID-19 has forced the need to own 21st-century qualities such as thinking creatively and becoming more self-aware. On the other hand, the results conform with the reported use of authentic assessment methods as assignments, including projects, presentations, and videos, among other things; assessment not only to assess the mastery of skills but also to develop students' abilities to direct their learning, monitor, evaluate their progress, develop self-regulation and self-management skills, and support them to be better prepared for their future life and career (Miller & Konstantinou, 2021; Xie et al., 2021). Additionally, alternative assessment methods such as portfolios are the best fit for evaluating student development and performance assessments, alongside simulations which can measure critical thinking and collaborative problem-solving (Soland et al., 2013). Yet, there is a gap here in the frequent use of MCQs which might be a good fit for assessing factual recall and higher-order thinking skills but could be replaced with open-response tools that are better for measuring 21-century skills. Hence, HEIs are encouraged to sustain adequate professional development programs to educate academics on new assessment trends and their integration into the online modality.

5. Conclusion and Lessons

There is a significant amount of evidence among educators in HEIs that the COVID-19 pandemic led to changes in teaching and learning practices particularly in terms of student assessment.

For the COVID-19 pandemic, three RQs needed to be answered. Our study scrutinized academics' assessment practices in response to the full transition to the online modality with respect to the Saudi context. In this regard, academics opted to restructure the content and weighting of their assessment plans with a tendency to reduce the number of assessment tasks set and lessen the expected workloads for instructors and students, accordingly. The lesson learnt, for the Saudi context and other HEIs, was to sustain this practice as the "new norm" by encouraging academic programs to adopt an assessment schedule with strategically selected tasks that can be spread out rather than clustered. Accordingly, high-impact assessment practices such as the use of collaborative assignments need to be embedded and sustained so that students can be adequately prepared for the assessment schedule. Further, post-Covid assessment practices revealed the adoption of authentic assessment methods and increased marks allocated for these methods compared to the traditional methods. This type of assessment ensures authenticity which could be viewed as a high-impact practice to motivate students, modify instruction, and create a stimulating learning environment. While this new trend should prevail in teaching and learning practices, the need for academics to prioritize their assessment tasks was reinforced. It is worth noting that in the Saudi context, assessment policies require academics to use alternative assessment methods; however, the "new norm" offers a good opportunity to comply with and sustain

these policies. Moreover, Saudi HEIs must scaffold their academic approaches to adopt authentic assessment in the online format by launching initiatives with academics.

Additionally, in the new norm, most courses are delivered predominantly using the online mode which tends to be "front heavy" for instructors as it requires a lot of time and effort and demands in order to plan for the assessment process effectively. Therefore, only the academic cluster and the course type had a significant impact on using the online format for assessment methods. This implied that assessment of the practical domain focussed more on the process rather than the hands-on skills which were not fully measurable using the available online formats for assessment methods. The lesson learnt for the Saudi context was the need to seek out new methods that tackle these skills in emergencies. Finally, academics reported critical thinking, problem-solving skills, digital skills, and creativity as top skills that ought to be assessed post-Covid-19. This requires the academic programs to include these skills as graduate attributes that contribute to fulfil the Vision 2030. Hence, HEIs are encouraged to sustain adequate professional development programs to educate academics on the new assessment trends and their integration into the online modality.

More lessons for the Saudi context and other HEIs relate to the sustainability of online examination quality to ensure that these assessments are as rigorous as paper exams. This involves compliance with policies that ensure their quality before delivering them online, such as auditing online exams and educating academics to apply them. Further, artificial intelligence (AI) technologies will be the most innovative solution to ensure academic integrity by providing e-proctoring tools that trace the students' behaviour, namely disruptions, while taking exams. Finally, the abrupt transition to complete online instruction and assessment varied depending on each HEI's preparedness level and its digital learning resources. Although a plethora of applications and platforms are now available to foster online learning and assessment, more considerations with regard to the "pedagogical fit" needs to be taken into account in the context of the "new norm" (Baxter & Hailey, 2023) in order to determine the effectiveness of the online modality. To sum up, as the study scrutinized academics' assessment practices in response to the wholesale transition to the online modality, it is recommended that the best practices related to online assessment modality in the Saudi context are sustained and extended within all higher education institutions.

6. Limitations and Future Work

The study's findings may be of limited generalizability due to the small sample of participants and the specific contextual factors related to the university being examined. It is worth noting that, amongst other Saudi universities, the institution in this study is characterized by rigorous regulations for student assessment and high preparedness for online learning and assessment. However, lessons learnt from its findings can raise awareness about best practices in online assessment methods and their quality. The researchers

recommend conducting further studies in order to consider more specific factors such as institutional support, technological infrastructure, and individual motivations and capabilities that may have influenced the observed changes in assessment practices as they could deepen understanding of the reasons behind the modifications in the assessment practices. More studies are needed on sustaining the quality of online assessment in the new normal and employing innovative assessment methods. Another limitation is that the researchers applied the descriptive approach and relied on data collected from self-reported surveys which might not be a sufficient tool to provide in-depth data. Additionally, the open-ended question on 21st-century skills could be complemented by a justification for the skills selected and how the top-ranked skills can be effectively assessed in the online mode using alternative assessment methods and challenges that may arise in assessing them. Therefore, more studies incorporating direct observations, interviews or validating evidence via student feedback and performance outcomes are suggested to provide a richer understanding of the participants' experiences.

7. References

- Abduh, M. (2021). Full-time online assessment during COVID-19 lockdown: EFL teachers' perceptions. *Asian EFL Journal*, 28(1.1), 26–46.
- Akimov, A., & Malin, M. (2020). When old becomes new: A case study of oral examination as an online assessment tool. *Assessment & Evaluation in Higher Education*, 45(8), 1205–1221. <https://doi.org/10.1080/02602938.2020.1730301>
- Almahasheer, M. , Al Rubaish, A., Alkadi, A., Abdellatif, M., Ravinayagam, V., Assaf, W., Alomair, N. (2022). Faculty readiness for online teaching at Imam Abdulrahman Bin Faisal University during the COVID-19 crisis: A cross-sectional study. *F1000Research*, 10(840), 840. <https://doi.org/10.12688/f1000research.28173.1>
- Almossa, S. , & Alzahrani, S. (2022). Assessment practices in Saudi higher education during the COVID-19 pandemic. *Humanities and Social Sciences Communications* 9(5), 1-9. <https://doi.org/10.1057/s41599-021-01025-z>
- Almuqayteeb, T., & Mohamed, W. (forthcoming). Online assessment practices during the COVID-19 pandemic: An analysis of Saudi faculty experiences.
- Al-Samiri, R. (2021). English language teaching in Saudi Arabia in response to the COVID-19 pandemic: Challenges and positive outcomes. *Arab World English Journal (AWEJ) Special Issue on COVID 19 Challenges*, 1, 147–159. <https://dx.doi.org/10.24093/awej/COVID.11>
- Bakay, M. (2022). 21st Century skills for higher education students in EU countries: Perception of academicians and HR managers. *International Education Studies*, 15(2), 14-24. <https://doi.org/10.5539/ies.v15n2p14>
- Baxter, G., & Hainey, T. (2023). Remote learning in the context of COVID-19: Reviewing the effectiveness of synchronous online delivery. *Journal of Research in Innovative Teaching & Learning*, 1(1), 67–81. <https://doi.org/10.1108/jrit-12-2021-0086>
- Burgess, S., & Sievertsen, H. (2020). Schools, skills, and learning: The impact of COVID-19 on education. *VoxEu. org*. <https://cepr.org/voxeu/columns/schools-skills-and-learning-impact-covid-19-education>
- Byrne, C. (2022). What determines perceived graduate employability? Exploring the effects of personal characteristics, academic achievements and graduate skills in a survey experiment. *Studies in Higher Education*, 47(1), 159–176. <https://doi.org/10.1080/03075079.2020.1735329>

- Chen, V., Sandford, A., LaGrone, M., Charbonneau, K., Kong, J., & Ragavaloo, S. (2022). An exploration of instructors' and students' perspectives on remote delivery of courses during the COVID-19 pandemic. *British Journal of Educational Technology*, 53(3), 512–533. <https://doi.org/10.1111/bjet.13205>
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). New York: Academic Press.
- Coombs, A., DeLuca, C., LaPointe-McEwan, D., & Chalas, A. (2018). Changing approaches to classroom assessment: An empirical study across teacher career stages. *Teach Teacher Education* 71,134–144. <https://doi.org/10.1016/j.tate.2017.12.010>
- Creswell, J. (2014). *Qualitative, quantitative and mixed methods approaches*: Sage.
- Crosta, L., & Banda, V. (2021). *Italian report on 21st Century skills*. <https://static1.squarespace.com/static/5dc28ad57b92e564895cd0b9/t/602e321586ec796adaaab973/1613640>
- Farrell, O. (2020). Out of intense complexities, intense simplicities emerge: Assessment and the pivot online. *NIDL Blog*. <https://nidl.blog/2020/05/03/out-of-intense-complexities-intense-simplicities-emerge-assessment-and-the-pivot-online/>
- Fergus, S., Botha, M., & Scott, M. (2020). Insights gained during COVID-19: Refocusing laboratory assessments online. *Journal of Chemical Education*, 97(9), 3106–3109. <https://doi.org/10.1021/acs.jchemed.0c00568>
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). SAGE Publications.
- Gao, R., Lloyd, J., & Kim, Y. (2020). A desirable combination for undergraduate chemistry laboratories: Face-to-Face teaching with computer-aided, modifiable program for grading and assessment. *Journal of Chemical Education*, 97(9), 3028–3032. <https://doi.org/10.1021/acs.jchemed.0c00634>
- 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.
- Greenhill, V. (2010). 21st Century Knowledge and Skills in Educator Preparation. *Partnership for 21st century skills*.
- Hatzipanagos, S., Tait, A., & Amrane-Cooper, L. (2020). *Towards a post COVID-19 digital authentic assessment practice: When radical changes enhance the student experience*. Paper presented at the EDEN Proceedings 2020 Research Workshop | Lisbon, 21-23 October, 2020. <https://doi.org/10.1016/j.compedu.2011.06.004>
- Hodges, C., & Barbour, M. (2021). Assessing learning during emergency remote education. *Italian Journal of Educational Technology*, 29(2), 85–98.
- Huedo, M., Romero, C. , & Prieto-Andres, A. (2021). *Spanish report on 21st Century skills*. <https://static1.squarespace.com/static/5dc28ad57b92e564895cd0b9/t/602f74e26a304f5bc0d2538d/>
- Jankowski, N. (2020). Assessment during a crisis: Responding to a global pandemic. *National institute for learning outcomes assessment*. <https://www.learningoutcomesassessment.org/wp-content/uploads/2020/08/2020-COVID-Survey.pdf>
- Johnson, N., Veletsianos, G., & Seaman, J. (2020). US Faculty and administrators' experiences and approaches in the early weeks of the COVID-19 pandemic. *Online Learning*, 24(2), 6–21. <https://doi.org/10.24059/olj.v24i2.2285>
- Khodamoradi, A., Maghsoudi, M., & Saidi, M. (2022). Investigating the washback effect of online formative assessment (OFA) during the COVID-19 pandemic: A case of perceptual mismatches between prospective teachers and teacher educators. *Practical Assessment, Research, and Evaluation*, 27(1), 20. <https://doi.org/10.7275/47ry-1n56>

- Kiger, M. , & Varpio, L. (2020). Thematic analysis of qualitative data: AMEE guide no. 131. *Medical teacher*, 42(8), 846–854. <https://doi.org/10.1080/0142159x.2020.1755030>
- Lederman, D. (2020). Will shift to remote teaching be boon or bane for online learning. *Inside Higher Ed*, 18, 1-27. <https://www.insidehighered.com/digital-learning/article/2020/03/18/most-teaching-going-remote-will-help-or-hurt-online-learning>
- Martínez-Mesa, J., González-Chica, D. , Duquia, R., Bonamigo, R. , & Bastos, J. (2016). Sampling how to select participants in my research study?. *Anais brasileiros de dermatologia*, 91(3), 326–330. <https://doi.org/10.1590/abd1806-4841.20165254>
- 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), 1–24. <https://doi.org/10.1007/s40979-021-00083-9>
- Miller, E., & Konstantinou, I. (2021). Using reflective, authentic assessments to embed employability skills in higher education. *Journal of Work-Applied Management*, 14(1), 4–17. <https://doi.org/10.1108/jwam-02-2021-0014>
- MOE. (2020a). *Guide to exams and evaluation arrangements COVID-19*. <https://www.moe.gov.sa/en/HigherEducation/governmenthighereducation/Pages/GuidetoEXandEV.aspx>
- MOE. (2020b). *Guide to exams and evaluation arrangements. University semester work during the suspension of education for the prevention of COVID-19*. https://www.moe.gov.sa/_layouts/15/MOEResp/Guide_Exams_Evaluation_ArrangementsEn.pdf
- Montenegro-Rueda, M., Luque-de la Rosa, A., Sarasola Sánchez-Serrano, J. , & Fernández-Cerero, J. (2021). Assessment in higher education during the COVID-19 pandemic: A systematic review. *Sustainability*, 13(19), 10509. <https://doi.org/10.3390/su131910509>
- Nulty, D., (2008) The adequacy of response rates to online and paper surveys: What can be done? *Assessment & Evaluation in Higher Education*, 33(3), 301–314. <https://doi.org/10.1080/02602930701293231>
- Pather, N., Blyth, P., Chapman, J., Dayal, M., Flack, N. , Fogg, Q., Meyer, A. (2020). Forced disruption of anatomy education in Australia and New Zealand: An acute response to the COVID-19 pandemic. *Anatomical sciences education*, 13(3), 284–300. <https://doi.org/10.1002/ase.1968>
- Rahim, A. (2020). Guidelines for online assessment in emergency remote teaching during the COVID-19 Pandemic. *Education in Medicine Journal*, 12(2), 59-68. <https://doi.org/10.21315/eimj2020.12.2.6>
- Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online university teaching during and after the COVID-19 crisis: Refocusing teacher presence and learning activity. *Postdigital science and education*, 2(3), 923–945. <https://doi.org/10.1007/s42438-020-00155-y>
- Saunders, P., Tractenberg, R. , Chaterji, R., Amri, H., Harazduk, N., Gordon, J., Haramati, A. (2007). Promoting self-awareness and reflection through an experiential mind-body skills course for first year medical students. *Medical teacher*, 29(8), 778–784. <https://doi.org/10.1080/01421590701509647>
- Schuwirth, L., & Van der Vleuten, C. (2018). How to design a useful test: The principles of assessment. *Understanding medical education: evidence, theory, and practice*, 3, 275–289. <https://doi.org/10.1002/9781119373780.ch20>
- Slade, C., Lawrie, G., Taptamat, N., Browne, E., Sheppard, K., & Matthews, K. (2022). Insights into how academics reframed their assessment during a pandemic:

- Disciplinary variation and assessment as afterthought. *Assessment & Evaluation in Higher Education*, 47(4), 588–605. <https://doi.org/10.1080/02602938.2021.1933379>
- Soland, J., Hamilton, L., & Stecher, B. (2013). *Measuring 21st Century Competencies Guidance for Educators*. Global Cities Education Network Report, RAND Corporation. <https://en.unesco.org/icted/sites/default/files/2019-04/gcen-measuring21cskills.pdf>
- Sotiriadou, P., Logan, D., Daly, A., & Guest, R. (2020). The role of authentic assessment to preserve academic integrity and promote skill development and employability. *Studies in Higher Education*, 45(11), 2132–2148. <https://doi.org/10.1080/03075079.2019.1582015>
- Weleschuk, A., Dyjur, P., & Kelly, P. (2019). *Online assessment in higher education*. Canada: Taylor Institute for Teaching and Learning.
- Wright, K. (2017). Researching internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. *Journal of Computer-Mediated Communication*, 10(3). <https://doi.org/10.1111/j.1083-6101.2005.tb00259.x>
- Xie, J., Rice, M. , & Griswold, D. (2021). Instructional designers' shifting thinking about supporting teaching during and post-COVID-19. *Distance Education*, 42(3), 331–351. <https://doi.org/10.1080/01587919.2021.1956305>
- Zilvinskis, J. (2015). Using authentic assessment to reinforce student learning in high-impact practices. *Assessment Update*, 27(6), 7–13. <https://doi.org/10.1002/au.30040>