FEATURE ARTICLE

Virtual Learning Assessment: Practical Strategies for Instructors in Higher Education

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ABSTRACT

Many universities have been designing and implementing online instruction for years, but the COVID-19 pandemic created an unexpected impetus for the expansion of virtual learning. Instructors and students who may not have previously chosen or experienced online instruction found themselves in need of safe, virtual options, and it appears that the general shift to virtual learning is here to stay. Strong, reliable assessment is a major component of virtual instruction, and instructors have several options for structuring student feedback. This article reviews the relevant literature regarding effective online assessment techniques and makes recommendations for the use of examinations and more authentic assessments, including video demonstrations, group projects, and discussion forums. Various data analytics within Learning Management Systems (LMS) are also explored. Discussion includes implications of online assessment and avenues for important research to strengthen response to this growing need.

Keywords: virtual learning, virtual instruction, higher education institutions, online assessment

As Spring 2020 arrived, many could not anticipate the challenges on the horizon. The emergence of a pandemic, COVID-19, presented novel situations never before faced: personally, professionally, and economically. Typical, familiar routines were going to change, and education was not spared this new reality. While businesses closed and homes became office spaces and schools for many families, education systems navigated new territory in virtual instructional delivery. Virtual instructional delivery impacted educational settings from kindergarten through university-level institutions (Gonzalez et al., 2020; Marshall et al., 2020). Virtual delivery of instruction at institutes of higher education was not a new concept before COVID-19; however, the widespread transition of a great number of students was unprecedented. In an extremely short time, a vast number of instructors were faced with the challenge of making a novice shift to the use of online learning management systems (LMS) and virtual learning strategies (Perrotta & Bohan, 2020).

Virtual instruction in a higher education setting is characterized by varied and diverse instructional methods. A review of previous research indicates that the process of learning online is typically categorized by the instructional delivery of content and student feedback (Gaytan & McEwen, 2007; Sieber, 2005). Traditionally, instruction in higher education occurs in a face-to-face setting, whereas online instruction is becoming a more common and widely accepted approach (Barnard-Brak & Shiu, 2010). In light of this rapid and recent demand for the use of virtual instructional technology at institutes of higher education nationwide, this article seeks to offer support to instructors responsible for virtual instructional delivery. The following demonstration of promising strategies for virtual learning assessment emphasizes the critical role assessment plays in postsecondary student performance. The use and modification

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of traditional exams and more authentic assessments, such as video demonstrations, group projects, and discussion forums, are discussed. Authors provide recommendations for practical strategies to incorporate the effective use of online assessment in LMS.

Online Assessment in a Virtual Learning Environment

Varied and diverse instructional methods characterize virtual instruction in the higher education setting. Studies of student perspectives regarding face-to-face versus online instruction indicate that students prefer direct interaction, real-time communication with the instructor, the use of a variety of instructional methods, and responsive learning strategies during the initial delivery of course content (Gaytan & McEwen, 2007; Sieber, 2005). An online learning environment has been relevant and critical across institutes of higher education for more than 10 years (Corey & Ben-Porath, 2020; Gaytan & McEwen, 2007; Sieber, 2005; Young, 2006). Undergraduate and graduate students have previously chosen to engage in online learning due to location, employment schedules, or a preference for online instructional delivery (Gaytan & McEwen, 2007). However, students who may not have selected online learning as a preferred instructional approach previously have been forced into this learning environment due to COVID-19 (Perrotta & Bohan, 2020). This shift necessitates instructor competence in a virtual learning environment. Previous researchers have argued that online assessment can be more challenging than traditional assessment formats due to the demand for innovation and the absence of human interaction. For instance, Gaytan and McEwen (2007) found that "using effective assessment techniques is an essential part of effective teaching and learning in the electronic environment" (p. 118). Therefore, instructors can greatly improve online instruction and learning by developing assessments that encourage reflection and meaningful engagement with materials. The following discussion outlines virtual assessment formats and establishes online assessment guidelines for higher education course integration. See Figure 1 for an outline of helpful strategies for including assessment in online higher education courses. In addition to the thoughtful use of exams and authentic assessment strategies listed, authors encourage instructors to consider leveraging data-collection features embedded in LMS as a part of online assessment.

Figure 1

Tips for Effective Online Assessment

Type of Assessment	Strategies
Exams, General	• Limit access to exam items • Use virtual proctoring (i.e., lock-down browsers or video surveillance devices or systems) • Use open-ended essay questions • Consider open-resource exams
Exams, Multiple-Choice/Selection	• Use random item pools for exam question selection • Set time restrictions • Allow multiple trials • Reduce the weight of exam grades
Authentic Assessment, Video Demonstrations	• Provide structured guidelines for self and peer reflection/feedback • Provide and clearly communicate rubrics prior to submission of assignments
Authentic Assessment, Group Projects	• Create collaborative, field-based products • Provide instructor and peer feedback toward goals • Include anonymous or confidential peer reviews of contributions • Provide clear project rubrics
Authentic Assessment, Discussion Forums	• Introduce concrete questions • Use field-based examples to generate discussion • Allow students to grapple with questions that may not have an answer • Provide a resource for a common concern in each forum to focus the discussion on collaborative problem-solving • Provide a moderate level of direct feedback regarding discussion posts • Encourage peer responses

Note. Figure 1 adapted from Barry, 2012; Gaytan & McEwen, 2007; Harmon et al., 2010; Salter & Conneely, 2015; Schultz & Quinn, 2014; Sieber, 2005; Talley & Scherer, 2013; Young, 2006.

Exams

Exams and quizzes are often one of the first options considered by instructors for the assessment of knowledge and skills when developing an online course. Historically, student performance in online courses has been evaluated primarily through the use of unproctored, multiple-choice exams (Harmon et al., 2010). Despite the relative objectivity and longstanding history of these exams, instructors should look for ways to provide more authentic and interactive assessments of knowledge and skills (Kim et al., 2008; Shaw, 2019).

A major concern with online exams relates to integrity and academic dishonesty (Harmon et al., 2010). There is an ongoing investigation in the literature regarding cheating in online courses, with differing results when comparing rates, motivations, and types of cheating online as opposed to face-to-face classes (e.g., Stowell & Bennett, 2010; Watson & Sottile, 2010).

Despite these findings, researchers generally agree that online exams present an increased risk of cheating, particularly exams that are not proctored (Harmon et al., 2010; Watson & Sottile, 2010). Several adjustments improve online exams: limiting access to exam items or questions, reducing the weight of exam grades, and virtual proctoring, including the use of lock-down browsers or video surveillance systems. Virtual proctoring strategies are specifically recommended for exam integrity (Harmon et al., 2010) but are not always practical and could conflict with student needs or motivations for enrolling in online courses (Sieber, 2005).

Since unproctored multiple-choice exams are practical and likely to be very prevalent in online courses, instructors might consider three sensible strategies to improve these assessments: random item pool selection, time restrictions, and multiple trials. First, well-developed online question pools can allow for better content validity and comprehensive assessment of knowledge. To further improve this type of assessment, instructors should review item pools and select well-written questions that accurately represent their course objectives; this is especially true when using publisher-provided multiple-choice question pools. In this case, instructors should consider adding self-written questions to meet a predetermined ratio. For example, if a publisher question pool has 40 relevant questions, instructors may add 10 instructor-developed questions to reach a goal of 20% course-specific items. The exam can then be set to randomly select items from the larger question pool (Shuey, 2002, as cited in Harmon et al., 2010). This random selection of questions is a valuable feature in online courses and mimics shuffling strategies proven effective in face-to-face courses (e.g., multiple paper versions, etc.; Harmon et al., 2010).

To further protect exams and ensure a more accurate evaluation of knowledge, instructors should limit exam duration. In most cases, this can reduce cheating opportunities or unauthorized peer collaboration, especially in conjunction with random pool selection. Time limits are not a perfect solution and may be overwhelming to some students. However, Stowell and Bennett (2010) determined that student test anxiety is dependent on several factors beyond online vs. face-to-face administration and that limited virtual exam administration time may reduce student anxiety, depending upon student course expectations. In addition, allotting more time for exams does not seem to lead to better performance (Portolese et al., 2016). Instead of allowing students an unspecified amount of time to complete exams, instructors are encouraged to allow students to take exams or quizzes multiple times (two or more trials depending on the size of the question pool). Doing so may reduce the burden associated with time restrictions, with the added benefit of encouraging self-regulated learning. Namely, instructors can recommend or require students to take an exam once, early within a module, after exposure to relevant material. Based on initial trial results, students can identify areas of course content weakness, target concept development for the study, and make an additional attempt thus allowing formative evaluation through ongoing progress feedback (Kim et al., 2008).

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One further strategy is to shift from selection-based (i.e., multiple-choice, true-false) exams altogether. Open-answer or essay assessments encourage access to higher-order learning and knowledge, which is also more appropriate for open-source administration. Essay or short-answer exam responses allow assessment of writing and concept development beyond more basic recognition tasks, such as analyzing an argument or compare/contrast responses. In addition, writing samples can be pulled from previous products such as personal journals, online portfolios, or more collaborative, group writing (e.g., Google Docs) to allow for analysis of progress and formative assessment as well (Kim et al., 2008). Myyry and Joutsenvirta (2015) reported that although open-source exams do not directly correlate to learning outcomes, online access to sources (i.e., textbook, web-based) reduces anxiety and improves self-regulated learning. Open-source exams also emulate authentic, field-based scenarios and professional applications. In other words, real-world scenarios more often involve collaboration and collection of sources and information to address questions and problems in the field instead of accurate, in-

the-moment recall. If instructors have academic integrity concerns, most LMS have the ability to review student feedback through plagiarism-checking software (e.g., Turnitin; Watson & Sottile, 2010).

Authentic Assessment

Shaw (2019) defined authentic assessments as "creative learning experiences to test students' skills and knowledge in realistic situations," which require the application of student learning. Authentic assessments bridge student critical thinking capacity and are best used in conjunction with more "traditional" assessment approaches (Kim et al., 2008). As such, authentic assessment can be applied in many creative ways in a virtual setting.

Video Demonstrations

Student-developed video is an authentic assessment strategy that facilitates collaboration and peer-assisted learning. Video demonstrations involve the recording of mock or actual professional skills and are often used in healthcare or mental health fields for clinical skills and psychological assessments (e.g., Roberts & Davis, 2015; Seif et al., 2013). Video presentations challenge students to synthesize and integrate knowledge through field-based applications (Barry, 2012; Talley & Scherer, 2013). LMS and online resources for video recording and collaboration (e.g., Zoom, YouTube, VoiceThread, etc.) are becoming more available and accessible to students and universities. These platforms make it easy for students to create and submit high-quality recordings and presentations with most cell phones or laptops. Both synchronous and asynchronous video delivery increases student engagement through thoughtful review, self and peer evaluation, instructor evaluation, and feedback. When paired with structured guidelines for self and peer reflection, student videos can be an effective strategy for self-regulated learning and improve positive learning behaviors (Barry, 2012; Schultz & Quinn, 2014; Talley & Scherer, 2013). Additionally, assessment of student videos must utilize rubrics that are clearly communicated for both the instructor's assessment of knowledge and skills as well as for the student's self- and peer-review (Barry, 2012; Schultz & Quinn, 2014).

Group Projects

Group projects, another authentic assessment technique, develop transferable skills in collaboration and communication. Through developing a collaborative product, students share knowledge and provide peer evaluation and feedback. Group projects cultivate self-regulated learning and real-world skills and are most effective when groups are given ongoing progress feedback (Tsai, 2013). In this way, instructors effectively develop practical, professional skills by designing group collaborations to mimic professional products (e.g., lesson plans for teachers). Additionally, group projects reduce instructor grading demands, which can be especially helpful when providing feedback on lengthy writing assessments. Current and emerging platforms (e.g., Google Docs, Dropbox Paper, Remind or social media) allow student groups to write, edit, comment, and provide dynamic peer assistance to develop papers, essays, and presentations. Instructors can use these same editing and collaborative features to check for understanding and provide more frequent or timely feedback.

Although some students may dislike group assignments, online students generally perceive them as do students in face-to-face classes (Johnson, 2006). Students view the modeling of structured and timely communication and use of meaningful examples as particularly effective practices in online courses (Young, 2006), and these can help to orient students to group expectations as well. Using rubrics for group projects helps instructors set clear expectations and encourages timely feedback on progress (Gaytan & McEwen, 2007). To be effective, rubrics should define the project tasks that are relevant to practice, tie to learning objectives, and clearly state the criteria used for evaluation (Shaw, 2019). Rubrics also ensure common goals and guide the division of responsibilities within groups. Similarly, it is reasonable that student concern could exist regarding the assignment and grading equality among group members. To combat this concern, authors suggest that instructors create opportunities for anonymous or confidential student self and peer feedback regarding their group contributions. If well structured, this feedback may be used as a portion of the project grade or included as a separate course participation grade.

Discussion Forums

Student discussion forums are another common, well-documented strategy to evaluate virtual student progress and knowledge acquisition (Balaji & Chakrabarti, 2010; Kim et al., 2008). Discussion forums are a convenient assessment tool that allows all students to socially engage in course content, which is otherwise difficult in face-to-face classes due to time and space constraints or social dynamics. Student perceptions and engagement levels during online discussion forums are varied; however, it is apparent that structure and clear expectations are critical (Balaji & Chakrabarti, 2010; Salter & Conneely, 2015).

Discussions designed to target student-centered, field-based problem solving improve course performance and learning (Stockwell et al., 2015). Instructors should pose concrete questions, use field-based examples to generate discussion, and, when possible, allow students to grapple with questions that may not have an answer (Salter & Conneely, 2015). Further support may be given by providing a video link or article about a common concern or debate in each forum to help focus the discussion on collaborative problem-solving. Finally, instructors should strive to provide a moderate level of direct feedback regarding discussion posts and encourage peer responses (Balaji & Chakrabarti, 2010; Salter & Conneely, 2015). These strategies have encouraging results, even in courses that are often viewed as involving more technical skills, such as statistics (Everson & Garfield, 2008). When structured in this way, McDougall (2015) found virtual discussion forums encouraged respectful disagreement and conceptual development that students found authentic and beneficial. In addition, discussion forums allow for further assessment of writing development and skills, similar to essay prompts on exams. Importantly, though, discussion forums seem to build writing skills and empowerment through self-reflection and use of peer models in written posts (Salter & Conneely, 2015). Sieber (2005) also recommended that students should be required to write discussion posts in a professional communication style, which will further develop practical writing skills and reinforce the relevance of these assessments.

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Leveraging LMS Features for Assessment

It is highly recommended that instructors take advantage of monitoring technology available in many LMS. Metric tracking can be used and reviewed for engagement of course content. You (2016) noted that student self-regulated learning behaviors (e.g., frequency of logins, time spent in content areas, number of assessment attempts, etc.) predicted success in an online course. In contrast to course attendance or participation, instructors can monitor and grade students' self-regulated learning behaviors through LMS evaluation metrics. By doing so, instructors communicate to students the importance of self-regulated learning and its relationship to successful learning outcomes. As an additional graded metric, students can be asked to self-report reading goals and time spent reading for each course module through a course survey. Student self-reporting strategies evaluate important metrics of student learning and support self-regulated learning and success in all courses.

In direct connection to recent, significant institutional changes due to COVID-19, instructors should consider using LMS features and technology to support students who may be unfamiliar with virtual learning. Student virtual learning experiences vary; student expectations and orientations toward learning drive virtual course outcomes (Johnson, 2006; Yurdugul & Menzi Cetin, 2015). Therefore, it is critical to establish clear student expectations early in the course during the virtual learning process (Sieber, 2005). Additionally, students have expressed a sense of social disconnection from course instructors and classmates in online courses (Plante & Asselin, 2014). Online databases, "copy" options, and other LMS embedded technology features can address perceived communication and social barriers in a virtual learning environment. Instructors are encouraged to develop step-by-step instructions with screenshots/images, aiding student orientation to course assessments. Students report positive reactions toward increased instructor guidance and value the use of LMS features that facilitate efficient and personalized communication, such as the calendar, chat, and notification features (Lonn & Teasley, 2009; Young, 2006).

Conclusion

The current demand for virtual assessment in technology-mediated systems is high. Institutes of higher education can improve students' virtual learning experiences through strategic assessment. Robust assessment does not rely on a single format but rather employs multiple metrics to measure student progress and knowledge acquisition. Instructors should continue to seek authentic assessments that engage students in collaborative problem-solving and provide opportunities for peer-assisted learning and peer evaluation through the development of field-based products (Kim et al., 2008). When instructors provide timely student feedback and continual progress communica-

tion throughout a course, students are most successful (Barry, 2012; Tsai, 2013).

Innovative technology and media are continuously being developed and implemented in education. An exhaustive list of innovative assessment strategies is beyond the scope of this article. However, the nature of virtual learning environments, especially in the wake of COVID-19, is of notable significance and elicits additional ethical challenges for privacy, fairness, and equity. Instructors should check with their institution's instructional technology policies when selecting class platforms outside of university-adopted LMS. Many online platforms could present a privacy or security risk, especially when relying on personal accounts. Even with clear instructions, instructors may be unable to monitor access or inappropriate interactions. Additionally, instructors face the challenge of creating virtual content and environments that are accessible for an increasing group of students who may not have otherwise opted for online instruction. Thus, instructors should carefully consider course expectations for assessment strategies based on student population, such as student demographics, access to consistent and stable internet, computer resources, fees for software programs, student ability to reply or respond within designated time frames, etc. Many strategies for online assessment may also make it difficult to provide necessary accommodations for disabilities or cultural and language differences.

Finally, despite these promising strategies for improved assessment methods, there are still avenues for further exploration in virtual instruction. Prompt and supportive feedback is critical (Mann, 2014; Plante & Asselin, 2014); however, future research should provide insight into the best type of feedback and its outcomes on student performance. Also, it is not clear if students provide open, unbiased feedback regarding self and peer contributions and progress in a virtual learning environment, even when the avenue for feedback is anonymous or confidential. It would be helpful to know how feedback improves engagement and performance and how assessment modality impacts these outcomes. For example, a sparsity of data exists concerning the relationship of multiple assessment trials for multiple-choice exams and student performance outcomes, content knowledge, or acquisition of positive self-regulated learning behaviors. Greater exploration of multiple assessment trials in online environments could contribute to improved student outcomes.

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