Classroom Assessment Techniques: A Literature Review

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Effective classroom assessment techniques are directly linked to course objectives and proposed outcomes. Results within formative and summative assessments have been studied in the online learning environment as educators seek to meet objectives with respect to student success in the non-traditional setting. Online classroom assessment techniques should reflect pedagogy, while measuring the application of new knowledge and learning objectives set forth by the curriculum. The purpose of this literature review is to present the goals, findings, limitations, and recommendations associated with various studies regarding classroom assessments techniques and their effectiveness in the online classroom. The question posed is whether or not classroom assessment techniques in the online classroom can be effective. Included herein is a literature review of existing studies to provide insight on the effectiveness of classroom assessment techniques in the online environment.

Classroom assessment techniques reflect pedagogy, measure the application of both new knowledge and course objectives, as well as identify learning outcomes. Results within summative and formative assessments have been measured in the online learning environment as educators seek to meet objectives with respect to student success in the non-traditional setting. The purpose of reviewing this research is to present the goals, findings, limitations, and recommendations associated with studies regarding classroom assessment techniques and their effectiveness when implemented in the online setting. Classroom assessment techniques in the online environment are effective in measuring course outcomes. Included herein is a literature review of existing studies, which offer insight into a variety of online classroom assessment techniques.

EXISTING RESEARCH

Goals, findings, and limitations within the proceeding studies, including the writers' supplemented recommendations, demonstrate that classroom assessment techniques in the online setting are effective for measuring and achieving course outcomes. The review of existing studies has established that educators who use classroom assessment techniques have aided students in meeting course objectives in the non-traditional environment. Whether through use of summative and formative assessments, electronic portfolios, or live interviews, a consensus of these studies implies that classroom assessments assisted in course objectives being achieved through instructional methods. This review contends that while heavily weighted on summative and formative assessments, other classroom assessments were effective in the online setting and an accumulation of these methods have proved that modality is not an issue for accomplishing course outcomes through assessment techniques. Effective assessments have demonstrated that learning has occurred (Robles & Braathen, 2002).

GOALS

The use of classroom assessment techniques was an innovative way for faculty to engage students in online learning. In a study conducted by Armellini and Aiyegbayo (2010), the goal was to uncover new online learning designs through the utilization of classroom assessment techniques. Pedagogically, learning objectives were the focus, and Armellini and Aiyegbayo (2010) intended to stimulate debate on relevant theoretical frameworks by reporting empirical research and technological developments for both educational and technological purposes. Armellini and Aiyegbayo (2010) moved beyond metadata in order to find reusable learning content and

searchable electronic libraries to support the learning objectives presented in the online classroom. The focus of the study was on Carpe Diem, a Latin term meaning "seize the day," which is a learning design program permitting academic course teams to seize two days to pedagogically design and embed appropriate online formative assessments into their courses (Armellini & Aiyegbayo, 2010). The study also addressed the use of technology in the design of formative assessments and the level of student and instructor engagement within the delivery of the course.

Lawton et al. (2012) researched how to develop evidence-based methodology with the goal of providing formative assessment and useful feedback during online learning. There was the use of online informational and social networks within instructional design to assess student expertise in specific subject matters. Small changes lead to a cumulative impact on learning in the online environment. Two versions of an online course derived from identical resources that integrated formative assessments were compared, which allowed instructors to provide feedback to students during the learning process (Lawton et al., 2012). Focused video resources were utilized to anchor the formative assessments within the instructional design process. The course utilized a freely available learning management system (LMS).

Additionally, Pereira et al. (2009) intended to develop pedagogical strategies for online undergraduate courses that promoted student learning and success by analyzing student online submission competencies in the form of electronic portfolios. This was a classroom assessment technique due to how students were assessed in a summative manner through their assignment submissions. Pereira et al. (2009) decided to implement a fully virtual innovative teaching and learning methodology. The pedagogical model adopted by the study was strongly controlled by the valuing of students' communal and social integration, the personalized monitoring of learning, and the respect for various life experiences (Pereira et al., 2009). This pedagogical model was based on four cornerstones; these included student-centered learning, flexibility, interaction, and digital inclusion, which were aligned with the key competences required for learners in the knowledge-based society in which they live according to Pereira et al. (2009). These ideologies guide the planning, design, organization of instruction, the nature of formative assessment, the type of materials developed, and the management of online activities (Pereira et al., 2009).

Within other existing research, Van Gog, Sluijsmans, Joosten-ten Brinke, and Prins (2010) proposed how to assess participants in complex domains by using formative assessment in the online environment. This described a method that was based on assessment theories and prominent instructional design for supporting learning in the online setting (Van Gog et al., 2010). The main idea of this study consisted of formative assessment tasks that focused on professional situations. For each professional situation, three levels of situational complexity were defined, and within each of these three levels, tasks were offered that differed in the degree of support offered to students (Van Gog et al., 2010). According to Van Gog et al. (2010), this environment supported new professionals in the online learning environment by providing insight to repertoire of behavior in professional situations and the quality of that behavior in regards to the assessed criteria. This simultaneously helped students develop insight into the standards that their own behavior should eventually match (Van Gog et al., 2010).

Vonderwell and Boboc (2013) proposed the use of formative assessment techniques to improve an instructor's understanding of online students' needs. The formative assessment technique used by Vonderwell and Boboc (2013) was online journaling to track student progress. The goal was to tie online journaling to the other course assignments, which meant that there would be a coupling of formative and summative assessments. Proper modeling and gradual implementation of online journaling before students could fully engage in the learning opportunity was another focus of the study (Vonderwell & Boboc, 2013). When online journaling was completed in teams, assigning roles helped increase reflective critical thinking and student responsibility. Classroom assessment techniques included a reflection paper (used toward the end of a lesson), a one-minute paper (used during a lesson), role play by assigning students different tasks within group work, hook questions constructed by students based off the readings to engage in conversation on a topic objective, and frequent student check ins.

In the final study, Beebe, Vonderwell, and Boboc (2010) investigated faculty perceptions from seven different higher education institutions with respect to online classroom assessments that used interviews with combinations of open-ended questions. The purpose was to explore if face-to-face delivery formats for assessments could be mimicked effectively in the online modality. Assessment for and about learning were the main focus of this phenomenological approach. The key issues analyzed in this study were online assessment, distinguishing barriers, and identifying effective assessment methods. It was "important to understand current faculty practices of assessment as well as the factors that influence assessment in order to increase the quality of teaching and learning in the online environment" (Beebe et al., 2010, p.2).

FINDINGS

Findings indicated that online formative assessments were successful as long as the instructor was involved and active (Armellini & Aiyegbayo, 2010). The instructors collaborated with students to ensure successful execution of the formative assessments. This study incorporated innovative ways to assess online learners, including its successful collaborative design, as noted by Armellini and Aiyegbayo (2010). Focusing on learning objectives encouraged an organizational reform in the educational system as well as within the course itself to better the learning experience for online students (Armellini & Aiyegbayo, 2010). Cognitive mapping was the main concept Armellini and Aiyegbayo (2010) used. The findings suggested that Carpe Diem was a powerful and effective team-based procedure to "foster pedagogical change and innovation in learning design and assessment practices" (Armellini & Aiyegbayo, 2010, p. 922). The online activities designed during Carpe Diem were successfully used primarily for learning and formative assessment, with exception to some summative assessments. Web 2.0 tools were employed to enable collaborative online learning and were prominent in the new designs (Armellini & Aiyegbayo, 2010). The instructor's moderation skills were essential to engaging students and capitalizing on the benefits of formative assessments in the online classroom as determined by Armellini and Aiyegbayo (2010).

There were other results that demonstrated the collaborative capabilities of the LMS supported course development; however, it had limited voluntary use by the participants as Lawton et al. (2012) indicated. The study demonstrated that formative assessments make significant positive differences in the learning outcomes of students in online courses (Lawton et al., 2012). Students learned more information overall with more positive attitudes toward the course content and their future learning. In this model, learning had less dependence on initial knowledge. The capabilities of the LMS supported course development but showed limited spontaneous use by students during the study (Lawton et al., 2012).

There were more findings that exhibited an improvement in using alternative assessment strategies; nevertheless, there was an unclear pattern in the examined student submissions (Pereira et al., 2009). Pereira et al. (2009) noted that the study indicated the submission delivery could also be used in other assessment strategies. The study demonstrated that formative classroom assessments and design methods that stress crucial concepts made significant positive differences in learning outcomes in online courses (Pereira et al., 2009). This was a straightforward implementation format and a clear means of measuring effectiveness according to Pereira et al. (2009). Each electronic portfolio was able to accommodate the types of competencies measured in the formative assessments (Pereira et al., 2009). There was diversity concerning the types of competences being assessed in each electronic portfolio, but Pereira et al. (2009) contend that descriptive characterization helped to rectify this.

The Van Gog et al. (2010) study allowed participants to review their scores and evaluate self-knowledge of skill level. The research demonstrated that online assessments could help to improve students' perspectives regarding the online classroom (Van Gog et al., 2010). The formative assessments in this online learning environment had positive results. Students indicated that the assessments focused on relevant situations, instructor behavior was effective, and that this could contribute to further professional development of beginning instructors (Van Gog et al., 2010). The study completed by Van Gog et al. (2010) presented a division in complexity levels that was positively evaluated, and the students recognized the difference between tasks encompassing analysis and observation, which might seem similar at first glance. The

students appreciated instructor feedback options embedded within the formative assessments (Van Gog et al., 2010).

This next study resulted in reconstructing student and instructor roles by adapting formative assessments to individual student needs, which improved formative assessment in student learning (Vonderwell & Boboc, 2013). Vonderwell and Boboc (2013) suggested instructor accountability and using a reflective, pro-active approach in the formative assessment techniques that online instructors utilized to recognize student progress. Journal entries, whether completed individually or in pairs, were a way for students to reflect on what they learned from the formative assessments put forth by the instructor. An integral part of the planning process related to the use of the comprehensive range of assessment strategies (Vonderwell & Boboc, 2013). Generating an assessment plan for the duration of the entire online class helped instructors to map out their pedagogical strategies and materials. Therefore, student engagement and overall online activity were enhanced according to Vonderwell and Boboc (2013). In this study, the authors were aware of students' connectivity options, so there was no digital divide by asking students to use technological tools that were not readily available to them (Vonderwell & Boboc, 2013).

In the final reviewed study, five major themes developed as a result of the research of Beebe et al. (2010), including time management, student responsibility and initiative, structure of online medium, complexity of content, and informal assessment. Time management alluded to students preferring immediate feedback and in turn placing emphasis on communication. Without student engagement, instructors believed they did not have a clear picture of students' needs, and therefore, emphasized the importance of students taking charge of their inquiries and education (Beebe et al., 2010). The earlier materials and objectives were posted the quicker faculty could identify areas of opportunity. Providing visual cues to match online course materials assisted in clarification of class expectations. The less complex the course content, then the easier the assessment could be mimicked in the online setting (Beebe et al., 2010). Students were found to perform better on informal assessments when they took a proactive approach to their own education to gain clarification on course materials and objectives. Not only did students need to be heavily involved and proactive, it was necessary for instructors to provide timely materials and visual cues that contributed to better course outcomes through classroom assessments (Beebe et al., 2010).

LIMITATIONS

Several limitations surfaced within the Armellini and Aiyegbayo (2010) study. These limitations consisted of the number of instructors available to participate in the research study, the amount of disciplines in the research, and the absence of primary data from the participants (Armellini & Aiyegbayo, 2010). As far as classroom assessment techniques in the online setting, Armellini and Aiyegbayo (2010) used a Carpe Diem approach with instructors, which left room for improvement in how the online assessments were implemented and evaluated. If more instructors were utilized and interviewed, then the study would have provided greater comprehensive interpretation of the intended purpose. In addition, data from the students were not previously collected because the instructors cited input from students in Carpe Diem interviews to show how the students accepted the new designs. Direct student data collected during and at the end of the studied courses would have "provided a more complete understanding of the changes in learning design and how they affected the students' learning and assessment experience" (Armellini & Aiyegbayo, 2010, p. 933).

Lawton et al. (2012) also had limitations in their work, including lack of using the provided tools, a significant number of participants who did not complete the study, and functional issues with the LMS. Within these LMS issues, there were technological and operational restrictions (Lawton et al., 2012). Lawton et al. (2012) only had participants from one type of profession and content area, which allowed little room for generalization. Areas for further research were mining the data created by students' online activities and integrating feedback with reliable tasks that incorporated the weekly objectives (Lawton et al., 2012).

Limitations within the study conducted by Pereira et al. (2009) involved technological issues, unclear submissions for some students, and operational functionality. Pereira et al. (2009) were not clear in prompting the students how to complete competencies within their electronic portfolios. In

addition, electronic portfolios submitted under different content areas made it difficult to determine the effectiveness of the study (Pereira et al., 2009). It may have been more effective to hone in on one or two contents using multiple beta online classrooms.

Additionally, performing certain tasks including different levels of difficulty as indicated by Van Gog et al. (2010) contributed to limitations. Van Gog et al. (2010) based their work on teacher education and further research in other fields is required to determine accuracy. The students liked the idea of the formative assessments, but they were overwhelmed by the amount of assessments that were utilized by the instructor. In addition, the students felt there were too many questions to be answered within each individual assessment (Van Gog et al., 2010).

Vonderwell and Boboc (2013) noted limitations that included LMS difficulties, interdependent technical considerations, planning processes, and operational uses. Vonderwell and Boboc (2013) were unclear on the success rates of the formative assessments and considered creating student groups for the journaling process but wanted to shy away from relying on peer input. Student pairing should take into account the frequency and complexity of the online journal entries as indicated by Vonderwell and Boboc (2013). Technical considerations and instructional design were interdependent, which means that the online learning platform should have accommodated the nature of the class and its requirements for student success (Vonderwell & Boboc, 2013).

It was necessary for additional reflection and more qualitative assessment as opposed to quantitative assessment to measure student growth that caused limitations according to Beebe et al. (2010). There was also a need to construct an appropriate pedagogy of learning and assessment within the environment of the online classroom (Beebe et al., 2010). According to Beebe et al. (2010), there should not be a mechanistic transfer from one environment to the other without due consideration of the intended purpose and outcome. Both instructors and students must be informed about the effective implementation of assessment strategies in the online setting (Beebe et al., 2010). This also required further research regarding the essential shift in the perception of roles in the assessment process (Beebe et al., 2010). The increased individualization and high frequency of feedback in such learning settings were associated with an increasing and emerging partnership between instructors and students (Beebe et al., 2010).

RECOMMENDATIONS

Areas of opportunity exist within any research study. Collectively, these studies leave room for areas of opportunity in instructional design and technology systems. Funding and time also seem to be the root of certain shortcomings in the existing research of online classroom assessment techniques. The authors recommend that alternative classroom assessments online be explored. The bulk of the research the writers reviewed was weighted heavily on summative and formative assessments. While these are excellent measures for student learning and course outcomes, it does not capture all forms of learning styles or advancements made in technology. Future research should include specific media in the classroom, so assessments encompass methods that are aligned with all students' needs. Immediate feedback to students while they are in a class allows the students to understand their mistakes and gain new and accurate information prior to leaving the class or earning a poor grade. An additional recommendation would be more emphasis on self-assessment and peer review. In order for assessments to be effective, it must be an ongoing process that is not just active but also authentic (Robles & Braathen, 2002).

CONCLUSION

Classroom assessment techniques reflect pedagogy and measure the application of both new knowledge and course objectives in the identification of learning outcomes. The above review of existing studies has established that educators who use classroom assessment techniques are aiding students in meeting course objectives in the nontraditional online environment. This review of existing research has demonstrated how classroom assessments techniques are effective when implemented in the online setting. Lingering questions regarding whether classroom assessment techniques in the online classroom are effective is no longer assumed but substantiated throughout existing research. This can contribute formative assessment ideas to faculty and administration in online learning institutions.

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