Online Assessment Techniques

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Abstract

The online instructional delivery method should be used to facilitate teaching and promote learning. The obvious benefits of online courses may be convenience, flexibility, and "learning anytime, anywhere;" but teachers must ask if those benefits contribute to student learning outcomes. Online assessment must be used to measure both learning objectives and application of knowledge. The online educator should use assessment techniques to strategically reflect the pedagogy of online courses. Many current assessment techniques can be modified to use in online courses. There are also other skills, such as written communication, that may be enhanced due to the online delivery of instruction.

Introduction

THE WORLD WIDE WEB has opened a whole new venue for teaching and learning. Online learning is here to stay! It is replacing many traditional classroom settings and is changing the ways in which we teach. Students will be able to learn what they want, when they want it, where they want to, how much they want, and, most importantly, will be able to assess what they have learned. The onus is now on the student. The student must be the active learner—self-disciplined, motivated, and learning through discovery.

Although educators at all levels have embraced using online technology as a teaching tool, the issue of assessment of student learning in an online course has not been thoroughly addressed. Although online instruction may be more efficient, convenient, and flexible for both students and teachers, it must be stressed that this technology should be used to facilitate teaching and promote learning. As teachers, how do we know that we are fulfilling those requirements when we deliver instruction online? Online assessment!

As teachers reflect upon instructional methodologies and include online learning as an instructional delivery mechanism, they must also reflect on their assessment strategies. The opportunity for online education brings about new considerations in assessment. Online assessment is more than just testing and evaluation of students. By keeping in mind some basic tenets of assessment, online educators can adapt their assessment activities to provide useful feedback, accountability, and opportunities to demonstrate quality.

Online assessment should be viewed as a system for evaluating student academic achievement. The assessment process should be viewed as a system because there are many components to measure. Just because it may be difficult to measure the amount of learning does not mean that learning has not taken place. The idea is that if online instructors keep improving their teaching strategies, the students will learn more.

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A study conducted at the University of North Dakota explored the methodology, benefits, and challenges of conducting student assessment in an online course. It compared student learning outcomes of an online course with student learning outcomes of a traditional course. Several questions were derived from this study that suggests educators need to do more quality assessment when they offer online courses:

1. How can instructors be prepared to use assessment methods effectively in the teaching of online courses?
2. What methods of assessment are necessary when delivering instruction online?
3. How are learning objectives measured with online course curricula?
4. What are the pedagogical considerations for teaching online courses?
5. How are critical thinking and problem solving assessed with this type of instruction?
6. How is student learning evaluated and assessed?

The focus of this article is to address these questions in three steps: first, by looking at how assessment in online courses is similar to assessment in traditional courses; second, by looking at how assessment in online courses is different from assessment in traditional courses; and third, by summarizing online assessment techniques.

Traditional Assessment Techniques

Whether teachers are delivering instruction in a traditional classroom or over the Internet, assessment instruments should be designed to provide students with immediate feedback and help them to understand and apply what they have learned. Students need to see the "fit" of the material with a real-world application. Courses must have learning objectives as their criteria, assessment methods to measure student learning outcomes, and feedback components to and from the student. Three key components of assessment are (1) measurement of the learning objectives, (2) self-assessments for students to measure their own achievement, and (3) interaction and feedback between and among the instructor and students.

Business educators must be careful to avoid the trap of simply using tests for assessment. Assessment needs to be more than a series of standardized tests or even end-of-the-term exams. Graded tests alone are not enough; tests are evaluation tools for assigning grades. Self-testing can be an effective tool for assessment. Self-tests should be used by students to assess their ability or level of understanding. Often, teachers do not even see the scores of self-tests. However, one way teachers could use self-tests is to identify weaknesses in the curriculum or content areas needing supplementary material.

A second trap to avoid is assessing students on subject matter that was not included in the course content, frustrating students and giving the teacher inaccurate results. This problem is typically a result of not aligning assessment with the learning objectives and the subject matter.

The learning objectives must be clearly defined for the students as well as for the instructor. The assessment tools must reflect the desired learning outcome. Each time the course is offered, the learning objectives should be examined.

Types of Assessment

Zeliff and Schultz (1998) identify three types of assessment used to provide feedback for students in business education: traditional, alternative, and performance. Traditional assessment typically measures lower-level cognitive skills. This domain includes factual recall and comprehension. Alternative assessment measures the affective domain and includes team activities, evaluations of self and peers, and reflection through logs and portfolios. This type of assessment examines students' attitudes and character traits. Performance assessment measures the psychomotor domain and includes students' demonstrations of competence in a skill or task. Examples include formatting documents, completing financial statements, and transcribing dictation.

Effective Assessment

In order for assessment to enhance teaching and learning, it needs to be an ongoing process to which all participants are committed. Effective assessment needs to be both active and authentic in online teaching. Classroom assessment has been practiced in the traditional classroom so that teachers were better able to monitor student progress, to understand and promote learning, and to increase their ability to help students become more effective, self-assessing, and self-directed learners (Angelo & Cross, 1993). These elements are even more crucial in continual online assessment. Emphatically stressed, ongoing assessment must be practiced in online course delivery as it is in traditional classrooms.

Rabinowitz (1995) asserted that the following principles be used to help ensure a better assessment system in the traditional classroom; online course assessment must include those same principles:

1. Identification of clear and concise standards.
2. Use of a variety of assessment measures.
3. Primarily performance-based assessment tasks.
4. Assessment tasks developed jointly by educators and industry representatives.
5. Assessment tasks that can be scored and accumulated at a later time.
6. Equity concerns are addressed throughout the assessment process.

Looking to suggested traditional teaching practices can help us to shape the assessments for online courses. The American Distance Education Consortium (ADEC) developed guiding principles for distance teaching and learning. Its first basic assumption is "the principles that lend themselves to quality face-to-face learning environments are often similar to those found in web-based environments." The American Association for Higher Education's "The Seven Principles of Good Practice in Undergraduate Education" has been revised for online teaching; however, the central focus of what constitutes good teaching is the same in either list of principles.

Once the learning objectives are defined, the assessments to measure the success of those objectives can be selected and/or developed. Some of the assessment techniques used in traditional courses can be used very effectively in online courses, either in their original form or with some modification. Furthermore, a combination of both direct and indirect assessment methods should be used. For example, assessing student work would be an indirect method of assessing student understanding of the material, while asking students if they understand the course content would be a direct method of assessing their understanding.

Summative Evaluation Versus Assessment

Wade (1999) describes student evaluations of instruction as "one of our most consistent and, we have traditionally thought, most strong indicators of course quality" (p. 95). When using student evaluations as measures of course quality, some questions will not have relevance to the online environment. For example, online students may have difficulty answering the question of "is the instructor fair and impartial in dealing with students?" because the students have limited interactions with each other. Or, the question "was the instructor approachable" is irrelevant if the students never visit with the instructor in-person. Such questions need to be either modified or eliminated. Furthermore, additional questions may need to be added, such as "did the instructor provide adequate feedback online?" or "was the online site easily navigable?"

It is important to note the difference between assessment and evaluation. The use of student evaluations at the end of the semester is a form of summative evaluation, which has no bearing on improving student learning during the current semester. While student evaluations may be helpful for the next time the course is offered, they are of little use for the current semester. The evaluation items must be written specifically to match the objectives of the course and must be updated to reflect curriculum changes from semester to semester or year to year.

A second traditional means of summative evaluation has been the use of surveys. Student opinions can provide immeasurable feedback if the timing is appropriate so that changes may be made for effective outcomes to occur. During the course, surveys can be an effective assessment tool. At the end of a course, surveys also can be an effective summative evaluation tool. Surveys provide feedback as to the strengths and weaknesses of the course. The identified weaknesses can be used to form an action plan for improvement. Additionally, the nature of an online course simplifies the administration and compilation of survey data. When students submit the survey online, their responses are anonymous and are immediately stored and tallied by the computer.

Although tests, quizzes, and grades are also typically evaluation tools, they can be helpful as instruments of the overall assessment plan. The assessment should not only use grades, but also use a combination of items, such as task performance, to measure student learning. The ability for computer scoring makes self-tests an effective assessment tool because they provide the student with immediate feedback.

When using regular class quizzes and tests for the dual purposes of evaluation and assessment, instructors need to be aware of potential concerns for safety and security of these testing tools. One of Perrin and Mayhew's (2000) findings was the potential for these items to be printed and shared, which seriously compromises the validity of the testing instruments. They gave an example of students printing their quizzes and sharing them with other students enrolled in the class. This action seemed to be more problematic when the students enrolled in the online courses were on-campus students, taking online courses to supplement their on-campus courses. To address this issue, the quizzes were timed by the computer and students were blocked from viewing the quizzes once they were submitted. Doing so can severely limit the effectiveness of a quiz as an assessment tool, essentially eliminating the ability for students to view the question to more fully understand their mistakes. Therefore, instructors may want to ensure that they provide enough ungraded self-tests and progress checks for students to view, print, and keep in addition to the graded quizzes.

Ryan (2000) reminds us that the assessment method needs to match the level of desired demonstrated learning. He believes that online assessment will require educators to modify their methods, indicating that the development of effective and reliable assessment for online students may require the greatest effort for innovation and departure from traditional practices.

Online Assessment Techniques

Moving courses from the traditional classroom to an online setting fundamentally shifts human interaction, communication, learning paradigms, and assessment techniques. The instructor needs to have academic competence in the course content before developing an effective assessment tool. Since the delivery method has changed, teachers also need to change the ways they demonstrate teaching and learning effectiveness.

Pedagogical Considerations

Online learning puts the burden on students to initiate the learning process. Students must be responsible to read the material, explore the links, partake in the discussion, ask questions, choose to learn the objectives, and set aside the time to learn. In an online environment, the focus shifts away from the teacher and allows more sharing among the students in the class. The interaction that takes place online mimics that of a small group discussion. The educational experience can be more stimulating and encourage more critical thinking than the traditional lecture.

Online instructors must be proficient in engaging students in communication via synchronous (simultaneous presence, realtime, e.g., chat rooms) or asynchronous (sequential, anytime, anywhere, e.g., email, threaded discussion forums) communication. Online instructors must also be able to engage students who are fearful of the technology.

Many of the instructor-led Internet classes rely heavily on the email and chat room systems. With the absence of a classroom to serve as a

meeting place, numerous students fear being lost in cyberspace without the guidance of a warm body. To promote a sense of connection, chat rooms are used to encourage social interaction between the participants while electronic mail enhances the learning experience by building on the learner-instructor relationship (Perrin & Mayhew, 2000).

The University of Illinois (1999) examined six pedagogical issues of online courses, one addressed quantitatively and the other five addressed qualitatively through the use of student surveys or student coursework:

1. Is the teaching style innovative?
2. Is learning competence equal or superior to that of a traditional classroom?
3. Are students engaged in the material? Does each student participate in the communication? Is there real depth to the students' responses?
4. Is there interaction between professors and their students, and between the students themselves? Has a "community of learners" been established from which students derive motivation, or do the students feel isolated?
5. Is access to technical support readily available?
6. For online programs that are more extensive, such as entire degree programs, are the signs of academic maturity present? Do the students think critically, and has a desire for life-long learning been fostered in them?

Assessing Interaction

When discussing the assessment of the quality of online courses, one recurring theme is the loss of the face-to-face relationship between a teacher and a student. Many believe that the lack of face-to-face contact will impact student learning and student perceptions of learning (O'Malley & McCraw, 1999; Roblyer & Ekhaml, 2000; University of Illinois, 1999). Where the face-to-face contact is missing, instructors must find a way to provide the interaction, especially for students who require motivation from the instructor.

Teacher/student interaction is a crucial component of assessment. The traditional classroom depicts the teacher at the front of the room, transferring information to the students in the form of lecture or notes. Online delivery also utilizes instructional notes, audio, video, and discussion. In fact, Draves (2000) states that there is more interaction between and among students and the teacher with online learning than with traditional instruction. Students are more apt to ask questions and participate in a threaded discussion group online than they are in a public forum. Asynchronous online discussion allows full participation by the classroom members at their own convenience. The instructor may browse through the discussion notes and glean the results of student understanding, leading to assessment of learning outcomes. One assessment device designed specifically for distance education is the "Rubric for Assessing Interactive Qualities of Distance Learning Courses" developed by Roblyer and Ekhaml (2000). This rubric helps to assess the level of a course's interactivity by looking at four separate elements of interaction: social goals, instructional goals, types and uses of technology, and impact of interactivity-changes in learner behaviors.

Draves (2000) continues to state that students will learn more, better, and faster than what they do in today's traditional classroom because of having the foremost authorities at their fingertips and having more personal attention, interaction, and individual feedback from the teacher. Online assessment is not just tracking the number of views or "hits" on a site or by each individual student. In other words, "just showing up" does not constitute learning. What the student is doing online is what should be measured. Participation is easy to measure online because online course software can tally the number of times that students view a particular page, how many minutes the student is on the site, etc. Learning outcomes, however, are more difficult to measure.

Self-Assessment

Self-assessment should be a major component of online courses. Even though, as teachers, we want to assess student learning, it is crucial that students participate in assessment of their own learning as well. Students will then be able to determine if they are meeting the required learning objectives, and if not, they may repeat the coursework for their own benefit. Therefore, participating in online self-testing, students measure their own learning and achievement.

Online pre-tests are an asset for student self-assessment because students can receive immediate feedback. Students may take a pre-test at the beginning of the lesson to determine their current knowledge, then study the material, and take the test again to assess their achievement. A pre-test allows students to determine the course content that they will learn. It tells them where they are in the learning/knowledge process of that material. Perhaps they already feel comfortable with much of the material or set of learning objectives for that particular section of the course. Most importantly, a pre-test allows the instructor to have a form of measurement on which to base learning outcomes after the student has taken the post-test or the final examination.

Advantages of Online Assessment

Questions posed in an online course allow for the instructor to have a better opportunity to evaluate overall student understanding than would be available in a traditional classroom. In a traditional classroom, when the teacher asks a question, only one student is able to answer. The teacher does not know if each of the other students in the class understands the concept unless he or she actively interacts with each of those students as well. When a question is posed online, each student will respond before he/she moves forward through the course.

In some ways, the very nature of the online course will help provide the means to address assessment issues. The written communication required by many online courses can be used as an indicator of student growth and learning. Instructors can look at the student's progress in grammar, organization, and development of ideas. Threaded discussions provide an opportunity for faculty to analyze the types of questions posed by the students, the types of responses given by the students, and the depth of the observations between teacher and student and student and student (Wade, 1999). Analysis of the student's contributions to a threaded

Table 1.

Instructional Quality Assessment Guide

Criterion/Question	Assessment Techniques
Do students understand the assignments?	Evaluate content of email, threaded discussions, and chat room] communications. Evaluate completeness of student work.
Do students understand the content material?	Review self-tests. Evaluate questions asked and depth of discussion in email, threaded discussions, and chat room conversations. Evaluate correctness of student work.
Are different learning styles being addressed?	Compare instructional strategies utilized, such as written, audio, and visual. Evaluate content of email, threaded discussions, and chat room communications.
Is the rigor of the online course comparable to the rigor in the traditional classroom?	Analyze difficulties expressed by students, deadlines being met. Evaluate depth of email, threaded discussions, and chat room communications. Compare student achievement levels between groups.
What are student opinions about the course?	Allow continuous feedback. Analyze postings to the message center. Allow anonymous student feedback. Analyze email, threaded discussions, and chat room communications.
How can instructors be sure to have students participate?	Require group discussions. Make assignments out of discussion components. Require mandatory drop box. Require ample number of assignments/activities.
Is there a group cohesiveness that has developed through the virtual. community?	Observe interaction in the chat room. Analyze results of group projects. Evaluate conversational quality of postings (Do students seem to be getting to know each other? Are they posting regularly) Evaluate depth of email, threaded discussions, and char room communications.
Are the learning outcomes being met?	Evaluate student work, quizzes, or self tests. Evaluate student questions or other feedback from students. Compare grades on student work. Use a rubric of learning outcomes. Provide opportunity to chat about objectives. Use self-assessments.

discussion will allow for assessment of that student's depth of understanding and conceptualization of ideas. Table 1 can be used as an assessment guide for measuring the instructional quality as well as student comfort with the online learning environment. The information provided in Table 1 illustrates how the nature of the online course lends itself well to assessing instructional quality.

Finally, the nature of an online course allows the instructor to create online portfolios of students' work. The instructor can create an electronic portfolio of each student's progress in the course, accumulating online homework, comments, instructor notes, and projects to assess student learning. Assessment will consist of monitoring those portfolios and measuring student learning through a pre-determined set of objectives.

The OnLine Training Institute (Redding & Rotzien, 2000) uses the interactive nature of the online course to learn more about student choices and cognitive thought processes through the measurement of the amount of time a student spends online completing specific activities. Instructors are able to know how long a student dwells on a question and the choices students are making when navigating through a course. Instructors may review this information regularly to improve instructional design.

Conclusion

As noted by Walvoord & Anderson (1998), "assessment is most effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time" (p. 189). As depicted in the Online Assessment Techniques Table (Table 2), many different online components and assessment criteria and tools are needed to accurately and thoroughly assess student learning. A variety of assessment tools can be used to determine if, after completing the student task in the online learning component, the student has met the pre-established learning outcome criteria. Finally, assessment should be ongoing and carried out through each chapter throughout the semester, to allow students to determine their own learning outcomes through self-testing.

An effective online educator must find ways to demonstrate that student learning has occurred. One type of assessment alone will not be enough to measure all of the objectives and outcomes desired. For online assessment to be effective, instructors must expand the assessment measures used throughout the instructional delivery of the online course. If education is moving towards outcome-based assessment, online education is an excellent vehicle for measurement of student learning outcomes and the application of knowledge. The assessment techniques used in traditional courses can usually be modified to reflect the nature and pedagogy of online courses. Online has expanded the menu of assessment techniques, many of which are more modern in nature.

Table 2.

Online Assessment Techniques

Online Component	Student Tasks	Assessment Criteria	Assessment Tools
Instructional Notes	Print notes Study material	Knowledge of the material	Self-test Assignments (Traditional)
Supplemental Readings	Read and study material	Knowledge of the material	Self-test Assignments (Traditional)
Drop Box	Send completed assignments	Knowledge of the material	Assignments Electronic portfolio (Traditional) (Alternative) (Performance)
External Links	Explore outside websites	Discovery learning	Writing Assignment OnlineDiscussion (Alternative) (Performance)
Asynchronous Threaded Discussion Group	Participate in discussion	Knowledge of subject matter Depth of understanding	Evaluate quality and quantity of discussion threads One-minute paper (Alternative)
Synchronous Chat Room	Participate in live discussion pertaining to the material	Knowledge of subject matter Depth of understanding	Evaluate quality and quantity of opinions, comments One-minute paper (Alternative)
Email	Ask questions of instructor or others in class	Degree of understanding/lack of understanding	Content of questions (Alternative)
Self-test*	Take the self-test to measure own learning	Knowledge of subject matter Depth of understanding	Answer key to test provided for immediate feedback (Traditional) (Alternative) (Performance)

*Self-tests are for student use or assessment use only, not for evaluation or grading.

References

Angelo, T. A., & Cross, K. P. (1993). *Classroom Assessment Techniques: A Handbook for College Teachers, 2Ed.* San Francisco: Jossey-Bass Publishers.

Draves, W. A. (2000). *Teaching Online.* River Falls, Wisconsin: LERN Books.

O'Malley, J., & McCraw, H. (1999,Winter). Students perceptions of distance learning, online learning and the traditional classroom. *Online Journal of Distance Learning Administration.* September 15, 20001. [On-line], 2(4). Available: http://www.westga.edu/~distance/omalley24.html

Perrin, K. M., & Mayhew, D. (2000, Winter). The reality of designing and implementing an internet-based course. *Online Journal of Distance Learning Administration.* September 15, 2001. [On-line], 3(4). Available: http://www.westga.edu/~distance/ojdla/winter 34/mayhew34.html

Rabinowitz, S. N. (1995). Beyond testing: a vision for an ideal school-to-work assessment system. *Vocational Education Journal,* 70(3), 27-29, 52.

Redding, T. R., & Rotzien, J. (2000, March). A comparative analysis of SDL online learning with traditional classroom learning. *OLS News,* 1-4.

Roblyer, M. D., & Ekhaml, L. (2000, Spring). How interactive are YOUR distance courses? A rubric for assessing interaction in distance learning. *Online Journal of Distance Learning Administration.* September 15, 2001. [On-line], 3(2). Available: http://wwww.westga.edu/~distance/roblyer32.html

Ryan, R. C. (2000). Student assessment comparison of lecture and online construction equipment and methods classes. *THE Journal,* 27(6), 78-83.

University of Illinois Faculty Seminar (1999). *Teaching at an internet distance: The pedagogy of online teaching and learning.* September 15, 2001. [On-line]. Available: http://www.vpaa.uillinois.edu/tid/report/tid_report.html

Wade, W. (1999). What do students know and how do we know that they know it? *THE Journal,* 27(3), 94-101.

Walvoord, B.E., & Anderson, V. J. (1998). *Effective Grading: A Tool for Learning and Assessment.* San Francisco: Jossey-Bass, Inc.

Zeliff, N., & Schultz, K. (1998). *Authentic Assessment in Action: Preparing for the Business Workplace.* Little Rock, AR: Delta Pi Epsilon.