

Online assessment

The internet provides exciting new opportunities for assessing student performance and progress. Web-based education tools can automate marking, give immediate and tailored feedback to students, provide ongoing opportunities for students to monitor their own progress and deliver a greatly reduced marking and administrative workload for instructors.

This paper explores some of the issues involved in using the web to deliver both formative assessment (ongoing evaluation that provides information about a student's progress) and summative assessment (final exams, often used to determine a student's rank in a course).

Formative assessment

What is formative assessment?

Formative assessment is the ongoing evaluation of student performance throughout a course and provides valuable information about progress to both instructors and the students themselves. It can include any activity that assists in gathering diagnostic information about progress. It is particularly effective when used to reduce the gap between what a student has actually learned and what, ideally, should have been learned. Electronic learning tools can be used to analyse this gap and assist students to identify a pathway toward the learning they require.

Integration of assessment and instruction

Formative assessment captures what students know in response to a question at a specific point in time and, if integrated with the teaching process, is a highly effective educational strategy that benefits both students and instructors (1).

When combined with detailed feedback, formative assessment highlights areas for personal development and provides students with information they can use to alter their learning approach. Instructors can use it to gather valuable information about what they can modify in their teaching practice to assist their students' progress.

Improve study habits

Continuously assessing student performance during a course through the use of regular, small, low-stakes assessments can positively influence the approach students bring to their study. Knowing that they have a weekly assessment to complete will often encourage more sustained studying than if assessment is focused only on a couple of points within a course.

Importance of feedback

For maximum benefit, any feedback should give specific comments about mistakes, have suggestions for improvement and encourage students to truly think about the question they are being asked (rather than simply concentrating on getting the answer right). To encourage students, and engender the feeling that everyone can be successful in the course, feedback should address individual progress and personal improvement in the achievement of set learning goals rather than performance in relation to others in the course (2).

Providing positive and useful feedback, coupled with the opportunity to apply their learning if they get a question wrong, can encourage students to

immediately reflect upon their learning and try the question again to improve their result.

Summative assessment

Why conduct summative assessment online?

Efficiencies offered by conducting summative assessment online include:

- Small updates to the assessment can easily be carried out (for example if it changes slightly from course to course or even student to student)
- By having students and markers networked, results can be delivered directly to the markers' desktops. This is particularly useful if learners are geographically dispersed
- Marking can be completely automated, ensuring consistency, removing the need for human intervention and delivering substantial cost savings in large-scale assessments
- Students can access the assessment from any location and at any time they are allowed, subject to proctoring or other security requirements

Educational requirements

Well designed online assessments are the key to successful educational outcomes. Computer questions and automated marking have moved well beyond simple multiple-choice questions. Online examinations can now be complex and varied. That said, the development of appropriate online examinations (for example, that address the limitations of screen size, one way navigation and the rigours of computer marking) requires expert instructional design.

Software requirements

In a high stakes environment such as a final examination, it is very important that the software used offers a high level of security. For example, software should be required to:

- ensure that the assessment can only be accessed from computers within a specific IP range at a specific time and for a specific period, to verify that all students are attempting the exam from the required location
- prevent computer-savvy students from being able to view the answers to the questions within the assessment's programming code
- allow the order of questions and the variables within them to be shuffled, pooled or otherwise randomised so that different students receive slightly different assessments.

Hardware requirements

Computer hardware and internet connectivity currently lead to the greatest challenges for online, summative assessments. If students are to sit a high-stakes examination simultaneously from the same location, the examination venue needs to have both a large number of internet-connected computers available and a very robust communications infrastructure. The servers that the examination is delivered from would also need to be secure, fast and reliable.

The level of security required to conduct a high-stakes examination online requires the computer at the student's end to frequently communicate with the server where the examination is hosted. This prevents students from being able to 'discover' the answers by searching the computer code. However, it also

greatly increases the risk of communication failure or disruption due to traffic on the computer connections.

Spreading the assessment out over a period of time and allowing students to complete it from varying locations significantly diminishes the very real risk of technical difficulties, because the infrastructure requirements can be shared between many different computers, servers and internet connections. In formative assessment, temporary internet disruptions can be managed. However in summative assessment there is no 'second chance', so the hardware and communication design is crucial.

Conclusion

Formative and summative assessments are important components of educational programs, and the internet provides many exciting opportunities to increase the usefulness and efficiency of both assessment types. Excellent instructional design that identifies and addresses learning goals and provides clear, detailed feedback tailored to student responses is the key success factor in developing formative assessment. Excellence in online summative assessment is also dependent upon specialty software, quality hardware and sufficient bandwidth.

(1) Sutton, R. (1998). Assessment and classroom learning. *Assessment in Education*, 5(1), extracted from paper by Paul Black and Dylan William, viewed 9 October 2002, http://english.unitecology.ac.nz/resources/resources/classroom_learning.html.

(2) Boston, C. (2002). The concept of formative assessment. *Practical Assessment, Research & Evaluation* 8(9), viewed 16 October 2002, <http://ericae.net/pare/getvn.asp?v=8&n=9>.

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