

On-line assessment

'If lower-order learning is an unintended educational consequence of on-line assessment, then any perceived or real gains made in efficiency, staff workload reduction and/or cost savings may be counterbalanced by a significant drop in the quality of higher education outcomes.'

Why consider on-line assessment?

A good deal of investigation and development is underway in Australian universities into the possibilities for effective and efficient on-line and computer-based assessment. The current commercial 'virtual learning environments', which integrate various curriculum elements at subject level into a single software portal, usually offer various built-in options for student assessment. As well, many on-line assessment initiatives are being locally developed to suit specific curriculum needs.

There are many reasons why on-line assessment is being adopted by Australian universities. Many academics are seeking to diversify assessment tasks, broaden the range of skills assessed and provide students with more timely and informative feedback on their progress. Others are wishing to meet student expectations for more flexible delivery and to generate efficiencies in assessment that can ease academic staff workloads. All staff involved in such initiatives are discovering they face a large number of technical and educational decisions.

The move to on-line and computer based assessment is a natural outcome of the increasing use of information and communication technologies to enhance learning. As more students seek flexibility in their courses, it seems inevitable there will be growing expectations for flexible assessment as well.

At the same time, in a climate of increasing academic workloads, the adoption of on-line assessment may help to manage large volumes of marking and assessment-related administration efficiently. The automation of routine on-line tasks, in particular, may have the potential in the long-term to provide time/cost-efficient student assessment, though the present evidence suggests that some on-line assessment, at least in the early stages, can add significantly both to staff workload and to overall expenses.

Is on-line assessment improving the assessment of student learning?

The major educational question to be answering is whether on-line assessment is having any influence on the quality of teaching and learning. Such a broad judgement is difficult to make, but there are growing educational concerns with current developments. While ICTs have certainly opened up significant possibilities for transforming the role and practice of assessment in higher education, the full possibilities are probably yet to be realised. There is some evidence that on-line assessment, unless carefully planned, can encourage students to focus on lower level cognitive skills. The educational effectiveness of on-line assessment that concentrates primarily or exclusively on true/false or multiple choice responses, for example, is highly questionable in a higher education environment. As is widely known, such approaches to assessment can have direct negative effects on student approaches to learning by encouraging narrow reproduction rather than the development of higher order cognition that involves, for example, critical evaluation.

If lower-order learning is an unintended educational consequence of on-line assessment, then any perceived or real gains made in efficiency, staff workload reduction and/or cost savings may be counterbalanced by a significant drop in the quality of higher education outcomes.

Realising the educational benefits of on-line assessment

This section provides a framework for making sound educational decisions about the use of on-line assessment. As would be expected, this framework is congruent with the basic principles for effective assessment in any format.

Assessment plays a central role in student learning whatever the mode. On-line learning can challenge students to learn new skills and ways of studying and learning:

"[On-line assessment]...definitely teaches skills not possible to learn from doing a normal essay"

"It assesses personal initiative well. You have to be able to work through things by yourself"

On-line assessment is but one of many modes that may be used to indicate to students which aspects of their learning are valued and will be rewarded. The use of on-line tools to assess learner progress toward subject objectives can take many forms including:

- Electronic submission of written assignments
- Parallel print and on-line assessment options where students are given the choice of whether and how they use on-line tools in assessment tasks
- Publication of documents on the web
- Labelling of on-line diagrams
- Manipulation of on-line graphs
- Completion of on-line quizzes
- Completion of short-answer and multiple choice questions
- On-line exams with monitored and controlled start and stop times
- Any formative or summative task carried out in a web-based environment.

Reactions to on-line assessment

There is a range of perceptions among academic staff about the worth of on-line learning:

"I have much hope for on-line teaching and learning. It has the ability to inform existing teaching and learning processes and to identify or reveal new possibilities or opportunities that we can't see at present".

"There is plenty of student feedback that shows the advantages of personal contact ...can't be replaced by on-line learning"

The broad choice of types of on-line assessment available generate a wide range of reactions from students:

"It's great, you can do it whenever you want"

"I was dragged kicking and screaming into the 21st century through having to do this...In the end this was good for me".

"On-line assessment is annoying"

One question asked frequently by students in relation to on-line assessment is, beyond flexibility, 'What is the point?' Where assessment tasks appear to add little or nothing to student learning, or worse, to hinder student learning, this is a reasonable question.

In the case of on-line examinations, the point, from a staff perspective might be to save time and effort. However, the experience of staff working in this area indicates that the design of on-line examinations can rapidly become far more complex and time-consuming than preparing conventional paper and pen examinations. This is in part because computers offer the potential to present students with more complex scenarios through the use of interactive resources (images, sound, simulation) than does print. If the potential for the use of interactive resources has not been realised and the verification protection is set up so that there is little difference between taking an exam in paper-and-pencil format and taking it on-line, it may be difficult for students to see the point in on-line examinations.

34 strategies for developing effective on-line assessment

Together these thirty-four strategies can be summarised into three checklists:

- An access and usage checklist
- A quality of teaching and learning checklist
- A technical and administrative checklist.

Access and usage checklist

- 1)** Has any inherent unfairness if some students are less familiar with computer use than others (for example, some international students and some older students) been avoided?
- 2)** While most students have access to computers at home, some do not – does the design of the task ensure that this latter group is not disadvantaged?
- 3)** Is student access to assessment tasks and related material assured?
- 4)** Has the potential issue of using the on-line medium as the principal or sole vehicle for assessment, thereby disadvantaging or excluding some learners, (Morgan and Reilly, 1999) been avoided?
- 5)** Has the potential issue of significant financial costs associated with external access to university computer networks been addressed?

- 6) Has the potential issue of access to on-campus university computers been addressed? *“It’s very time consuming to travel to uni and line up to get a computer”*
- 7) Has equity been ensured in relation to the cost of students printing large amounts of material?
- 8) Have appropriate educative resources been made available to address the issue of ICT skills?

Quality of teaching and learning checklist

- 9) Does the on-line assessment assess anything that can’t be assessed as well (or more effectively) in a traditional format ?
- 10) Have greater opportunities been provided for students to practise their knowledge and skills than are available in traditional formats?
- 11) Has the highly valued and expected flexibility of time-of-day access, pace of work and time spent on task been incorporated?
- 12) Have the opportunities for diagnostic, continuous, case-based and/or formative assessment of student learning been taken?
- 13) Is student learning related to subject content knowledge, understanding and skills being assessed rather than, or in addition to, ICT skills?
- 14) If relevant, have opportunities for students to demonstrate creativity in their submissions, which is possible with other forms of assessment, been incorporated?
- 15) Where necessary, is the approach chosen to verify individual student performance/submission reliable?
- 16) Has the opportunity to plagiarise been eliminated or at least minimised?
- 17) Has the tendency, particularly where automated responses are incorporated, to focus on lower level cognitive skills been avoided or at least, supplemented with assessment of higher order learning?

“The particular assessment required us to look at articles or sites on the web, check their validity and critically analyse them. We learnt not just to accept all things on the web as true and correct but to always question the work of others on the web”

- 18) Are mechanisms to enable rapid feedback both to and from the students included?
- 19) Are examples of model assignments/exam answers on the web for student access, consideration and discussion?

For on-line examinations in particular:

- 20) Have practice on-line exams in the same format as the real exam been provided so students can prepare adequately?
- 21) Are all answers able to be changed by the student up until the point where the test is submitted?
- 22) Have question banks and random selection of items been used, where appropriate?
- 23) Have dynamic on-line test questions that are in themselves learning experiences been provided, incorporating rich information and activities through the use of interactive images, sound and text?

For evaluation in particular:

- 24) Have robust evaluation strategies that produce diagnostic, formative feedback on the success of on-line assessment been integrated into planning and development?
- 25) Has student feedback (including on-line discussion boards) been used for reflection on the content and quality of the discussion, as part of examination of teaching practices?

Technical and administrative checklist

- 26) Has interference to the on-line assessment from scheduled maintenance periods been planned for?
- 27) Has the system been kept as local as possible so that reliance on large (less reliable) networks is minimal?
- 28) Will the difficulties that some students have with passwords, access, usage and related issues be adequately managed by the system?
- 29) Have management systems been put in place to deal with student difficulties with matters unrelated to on-line assessment that they will attempt to solve through on-line systems (email, discussion boards etc)?
- 30) Where a range of computers and software packages are in use among students and staff, has the potential issue of compatibility and readability of files containing assignments that are submitted electronically been planned for?
- 31) Have simple but time consuming matters, such as students forgetting to put their names on electronically submitted assignments, been planned for?

For on-line tests and exams in particular:

- 32) Has adequate technical support during the development and use of on-line exams been ensured? Have emergency backup procedures been put in place?
- 33) Has the server containing the exam questions been isolated from the internet in order to maintain security?
- 34) Is the server reliable?

Where to start?

There are at least three useful guiding principles when starting to use on-line assessment. These are:

- Start with clear educational objectives
- Start small
- Start where success is most likely.

Start with clear educational objectives

Begin by considering how you would like to influence student learning then consider which technologies, if any, are appropriate to influence it in these ways. In particular, it might be useful to consider the following question:

‘How will the on-line assessment add to the learning experience for students?’

When making the decision about whether or not, and in which way(s) to use on-line assessment, it is also essential to take into account:

- The subject objectives – what is being assessed?
- The needs, characteristics and situations of the learners.

Table 1 summarises some examples of how subject objectives, modes of on-line assessment and learner characteristics intersect. Academic staff may need to consider learner access to and competence with technology for each objective stated in the table as it is likely to be relevant to each objective. Where students from educational backgrounds that may not have included learning experiences involving email, listservs and web forums form part of the student cohort, it is necessary to equip these students with the skills necessary to undertake assessment tasks that require the use of these formats.

Table 1: Objectives, modes and learner characteristics of on-line learning

If the goal or purpose is to:

**develop/
assess...**

one might use...

**but in addition to learner access to and
competence with technology, one may need
to consider, for example...**

(objective)	(mode)	(learner characteristics)
A body of knowledge	An on-line exam	<ul style="list-style-type: none"> The likelihood of cheating
Learner autonomy	An on-line quiz with formative feedback	<ul style="list-style-type: none"> That some students' ICT-related anxiety will dissuade them from using this mode
Group work skills	On-line study groups	<ul style="list-style-type: none"> Learner comprehension of how to contribute effectively Learner understanding of group product/process assessment Varying learner commitment to collaborative learning
Understanding of basic concepts	Web-based, self-paced, interactive modules with automated responses and no recorded marks or grades for students	<ul style="list-style-type: none"> Learner interest, motivation and engagement with modules/material given absence of marks/grades Effects on learners of heavy traffic at peak times
Student problem-solving skills	On-line 'role-play' where students adopt allocated roles and then solve a problem in role, with a minimum participation requirement only	<ul style="list-style-type: none"> Learner comprehension of how to contribute effectively Learner interest, motivation and engagement with role play/material given absence of marks/grades
Ability to think critically and articulate critical analysis	On-line scenarios and information with accompanying prompts and a discussion board, with a minimum participation requirement	<ul style="list-style-type: none"> Learner comprehension of how to contribute effectively Varying learner commitment to collaborative learning Possible variation in starting and completion times for distance and other students
Learner ability to reflect	Rhetorical, ethical or other questions and a web forum which learners must use to share their reflections, with a minimum participation requirement	<ul style="list-style-type: none"> Learner comprehension of how to contribute effectively Varying learner commitment to collaborative learning Possible variation in starting and completion times for distance and other students

NB. Table adapted from Leask (1999) and the University of South Australia, 2001.

Start small

The basic advice here is, initially, aim for quality rather than quantity.

A complete overhaul of the entire curriculum may not be the best place to start with introducing on-line assessment. Many academic staff have successfully started with an on-line assessment task that is a relatively minor proportion of the assessment for a subject. That way, any technical, educational or other difficulties that might arise can be resolved without the risk of seriously disadvantaging students.

It might also be useful to start with formative rather than summative assessment on-line. Any efforts made towards this end will be useful in themselves in providing feedback to students and therefore assisting learning, as well as in providing a 'trial run' for the more ambitious objective of putting summative assessment on-line.

Start where success is most likely

"On-line assessment must match the learning that is taking place and the desired objectives and outcomes"

Successful on-line assessment is most likely if that assessment is aligned with teaching and learning objectives. In other words, there should be a strong relationship between the purpose of on-line assessment task(s) and the intended outcomes of the subject. It is wise to design assessment tasks that require the students to integrate the material they have learned in the subject with their own interpretations of that material. The on-line assessment should also allow students to communicate their understandings and allow the provision of feedback to students on their efforts to these ends.

As well, academics involved in developing on-line assessment share numerous objectives, which are useful for guiding such development including:

- providing students with more flexibility in time, place and the selection of assessment options
- providing equitable opportunities for international and 'non-traditional' students to demonstrate their knowledge
- possibly identifying or revealing new possibilities/opportunities not seen at present.

These objectives illustrate how well on-line assessment suits formative assessment objectives. They also show how developments in on-line assessment are taking place in the context of efforts to build a richer overall teaching and learning environment — an example of the way in which information and communication technologies can be major catalysts for academics to revisit fundamental educative principles.

References

Leask, B. (1999). 'Issues in on-line delivery: quizzes and discussion groups', University of South Australia. www.unisanet.unisa.edu.au/flc/pdonline/Discussions_and_quizzes_materials.doc. Accessed 10/12/01

Morgan, C. and O'Reilly, M. (1999). *Assessing Open and Distance Learners*. Kogan Page, London.

University of South Australia, (2001). www.unisanet.unisa.edu.au/flc/pdonline/IssuesinOnlineAssessment.doc. Accessed 10/12/01