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Technology for Assessing Open, Distance and Flexible Learners

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Abstract

This paper describes use of the WWW to enhance assessment in the open, distance and flexible learning contexts. From their experiences as practitioners in instructional design and Web development, the authors consider effectiveness, efficiency and new opportunities in facilitating student assessment via the WWW. Discussion draws upon the body of literature in Web-based developments, open and distance learning, instructional design, research and case study data. Case studies from Australian universities demonstrate emerging practices and reflections brought about by a shift towards flexible delivery and the use of WWW technology. The dissolving of distinctions between on campus and off campus is also illustrated through case studies.

Objectives

Surveys were conducted by interview and email to consider the effectiveness, efficiency and new opportunities of online technologies in facilitating student assessment. A range of instructional designers and academic staff at Australian universities contributed to the surveys and provided details of their own experience.

The paper:

- reports on the relationship between interaction and assessment in the online environment
- reports innovative assessment practices of staff utilising online technology in a number of Australian and overseas Universities
- links research results to educational theory, instructional design theory and practices.

Limitations of assessment in traditional distance delivery

Despite the range of innovations associated with distance and open learning in recent years, which has successfully bridged the physical separation of teachers and learners, summative assessment activities seem relatively static and even conservative in comparison with assessment activities in face-to-face teaching contexts. It is not suggested that distance teachers are less innovative or creative than their face-to-face counterparts. To the contrary, in devising and facilitating assessment, distance teachers struggle with a range of logistics, including the geographic dispersal of students, the difficulties in facilitating educational dialogue and the inequities regarding access to resources.

Geographic dispersal

The logistics of a geographically dispersed cohort are quite considerable. Many learners are combining study with work and family commitments, and are thus studying at odd hours of the night and weekends. Learners may also be located in differing time zones. Making contact can be often difficult and labour intensive in comparison to the on-campus situation. Traditional distance education has relied heavily on the postal service for delivery of materials and exchange of assignments. This has lead to considerable difficulties with assessment, for example, protracted marking turn-around times are often such that students will have completed their second assessment before they have received feedback on their first. Hence the important formative role of these assessments is lost and this is often a source of complaint by students themselves.

Lack of interaction and dialogue

Teleconferences linking students with their teachers has been one vehicle used successfully to foster educational dialogue, although they are an expense which many institutions with declining budgets have had to forego. Hence in many instances the printed distance package becomes the sole teaching and learning experience for students. Evans and Nation (1989, 1992) have been critical of distance programs which rely on this kind of 'instructional industrialism', arguing for the importance of dialogue between teachers and learners at a distance, and the consequent making and negotiating of meanings as the foundation for any educational encounter. Certainly many distance educators would agree, not only regarding the quality of the learning encounter, but also as a means of 'humanising' the experience for learners, and diagnosing problems which may lead eventually to discontinuance. Without opportunities for dialogue, distance learners are not entering the verbal debates and critical discourses which are integral to face-to-face contexts, and this can result in tendencies towards uncritical or reproductive learning.

Inequity of access to resources

Another limitation of assessment in traditional distance education is the inequity of access by learners to a variety of resources. Learners receive study packages which usually incorporate core readings, although distance learners are nearly always encouraged to read more widely and are rewarded in assessment grades for evidence of this. Yet some learners in rural and remote locations experience obvious difficulties and this presents an equity problem for teachers — how to cater for the haves and have nots? One response by educators is to load the study materials with ever-increasing volumes of printed readings, but this will often create more problems than solutions, with spiralling printing costs for the institution and a passive learning population being fed all resources on demand to undertake their assignments. Another costly response by institutions is to provide document search and supply services to distance students through libraries. At the heart of this issue is the need for learners to develop skills in self-directed and lifelong learning with accompanying skills in search and retrieval of information — a skill which becomes even more critical when learners are based in rural and remote areas.

Impact upon distance assessment

The result of these various limitations in distance learning is that learners have been assessed within

narrow parameters and with a very limited range of methods, primarily essays. In the social sciences and humanities, distance learners have become what Carson (1996) refers to as 'essay writing machines'. Through a combination of a lack of resources and inherent constraints, there is little room for variety of assessments and hence a limited scope for development of professional and disciplinary skills. Although essays are a very efficient vehicle for testing learners' abilities in critical thinking and written communications, any graduating student would be expected to demonstrate a far wider cache of generic skills such as a variety of communications skills, technological literacy, problem solving skills, team work, and so forth.

Moving from traditional distance education to online learning

While there are still many issues to be addressed regarding the medium, online learning has the potential to address many of the limitations to assessment at a distance raised above.

In this new environment, physical separation of teachers and learners is less critical than in traditional distance learning. There is a declining reliance on postal services and expensive forms of telecommunications, and a corresponding rise in relatively easy web communications to facilitate discussions, collaborative learning, problem solving and formative and summative assessment.Yet the inherent flexibility of distance education remains intact. Learners can study at times and places to suit, so learning may still be tailored in with other competing commitments of busy adult learners.

For remote students who have experienced difficulties in accessing information and resources, the internet offers a considerably expanded opportunity in accessing resources. Online course materials may now embed numerous hyperlinks to other units, courses and information sites around the world of relevance to their study. Learners are encouraged to also undertake their own searching in areas of specific relevance to their study and assessments. The new challenge for learners, and indeed for all of us in the so-called 'information age', is to be able to quickly and critically evaluate the value of the information to the task at hand, and to sift adeptly through the numerous links and pointers which may take us off in any range of directions.

The online medium has the capacity to impact upon assessment considerably. New forms of interaction available to distance learners encourages greater discussion, debate and negotiation of meanings, consistent with constructivist pedagogies (Klemm & Snell, 1996). The diversity of discussions generated by students have the capacity to deepen students' approaches to the assessment tasks, encouraging more critical and reflective work. Students can be also be assessed through their participation in discussions and group work such as problem solving. New opportunities also arise in peer assessment which had been very difficult to arrange at a distance.

It is not surprising that the distinctions between on-campus and off-campus modes are dissolving as face-to-face teaching also utilises the medium for some or all of its activities. Through the use of computer conferencing spaces or tools and a range of electronic resources, teaching and learning can be conducted with greater flexibility for both students and staff in either mode. However, we need to ensure that we are really using the new medium to advantage, and that the limitations of the old pedagogies which emphasise the transfer of content at the expense of process (either by distance or face to face), are not thoughtlessly replicated (Turoff, 1997). On the one hand we will be relying on lessons from the past to inform our progress (McLuhan, 1964), on the other hand, as educators we do not want to be 'walking into the future backwards' (Turoff, 1997).

In such an open environment do we need flexible new models, methods and strategies for online assessment? Concerns are raised that we need to find new ways to think about assessment rather than transfer the issues of traditional, face-to-face or distance assessment to Web-based courses? Does the use of traditional terminology and assessment models, and the lack of alternative pedagogical

frameworks, result in assessment practices that perhaps do not address the characteristics and possibilities of the online medium?

Opportunities and issues in online assessment

As a medium for online learning, the internet provides opportunities to enhance the learning experience regardless of overall mode of study. The move towards flexibility in educational delivery has meant that asynchronous forms of communication, information and document exchange are commonplace for all students who have access to an electronic network.

The communication capabilities of online technologies are a bonus, in particular, for remote, unassertive or disabled students. With a more diverse cohort of virtual peers, the creation of an online social learning environment (Mason, 1991) becomes key to good facilitation of discussion. Berge (1996) further outlines four areas for successful online tutoring — pedagogical, social, managerial and technical. These areas are all important to consider when seizing upon opportunities provided by the internet. Some of these opportunities, particularly those pertaining to assessment, will be discussed and illustrated by case studies.

Online discussion

One of the most significant opportunities is the new forms of interaction and dialogue available through the synchronous and asynchronous communication tools, such as email, discussion lists and computer conferencing. Providing the learner has access to these tools through a computer and modem, a whole range of new interactions are available, notably with other learners and the teacher. It also creates opportunities for learners to be part of wider professional or vocational discourses via the ever-expanding number of specialised public access email and web forums.

Discussion can take many forms and, depending on the content area, works with pairs or larger groups with the inclusion or exclusion of the academic coordinator or subject expert. 26 techniques are outlined in Paulsen's (1995) 'Online Report on Pedagogical Techniques for Computer-Mediated Communication'. Many of these are evident from case studies gathered e.g. notice board, public tutorial, seminars, debate, simulations, team presentations, project work, informal socialising and community decision making.

Constructivism and conferencing

The pedagogy of constructivism, which supports learning as the making or constructing of meanings from learners' unique perspectives, has been popularly adopted in web teaching and learning. Klemm and Snell (1996) describe the power of online learning where computer conferencing is used to 'raise the intellectual level of group discourse by requiring student groups to produce tangible products (not just opinion comments)'. The conferencing environment which promotes constructivist activity such as shared decisions and solutions, group reports, prototypes and models, and projects, needs to be a well structured one. This paper provides examples where clear instructions are given and the structure of discussion requires participation in a number of designated forums for defined outcomes (Alexander & McKenzie, 1998).

Where conferencing is undertaken as a teaching strategy, not only does it need to be well integrated into the course content (Collins & Berge, 1996), but it will also be of greater purpose to students if it is assessed (Day, 1998).

Research concerning online discourse (Holt et al, 1998) has found that the 'actions of a moderator are peripheral instead of central' and should aim at facilitating and supporting discussion between students. Group projects, international collaboration and student centred assessment are three such methods, some discussion of these follows.

Group projects

Group projects are an outcome of collaboration where both the process and the outcomes of learning are based on an interdependence among students (Klemm & Snell, 1996). Excellent examples are provided of students conducting a formal online debate and an actual conference which they'd coordinated and posted to a Web site created for the purpose.

International collaboration

The opportunity for international collaboration which has emerged from internet technology (indeed, was the driving force behind its inception) is an exciting development for many disciplines. Students now have the opportunity to learn directly about other cultures through shared learning tasks in such areas as politics, media and business (Alexander & McKenzie, 1998). Collaboration between students from far flung institutions around the globe can considerably enrich the experience and broaden the contextual perspectives of each participant (Muchnik in Day, 1998).

Student-centered, peer and self assessment

In a student centred approach, assessment cannot be a unilateral activity. Stefani (1998) argues that assessment is an episode in learning where a shared understanding of the learning task and the assessment criteria is ideal. Online technologies enable agreements to be readily reached between teachers and learners in their negotiations regarding assessment.

Opportunities present themselves for learners to also structure their learning around immediate needs in their own lives and working environments. This 'authentic' assessment approach further enables learners to have a sense of ownership of the assessment tasks and encourages them to effectively transfer and test academic knowledge to real life or work situations.

Traditionally peer and self assessment have been seen as somewhat lacking in rigour and cumbersome to administer. Arguably any graduating student needs the ability to self evaluate and to make considered judgements of others' work. The key issues in peer and self assessment include ensuring the appropriateness of this approach, validity of students' judgements, shared understanding of assessment criteria and reliability (Gibbs, 1995). These issues still remain in the online medium, however, fresh approaches are being taken and can be seen in examples provided.

For some discipline areas and assessment techniques, peer assessment is not only appropriate but is a positive enhancement in terms of motivation and a sense of community. Self assessment is a process of reflection which moves along the path towards independent and autonomous learning.

Collection of case studies

Case study details were initially obtained through a series of interviews emerging from instructional designers (or similar) at each institution identifying exemplars in their own organisation. Interviews were no longer than one hour. The first round of interviews was recorded on audio tape and notes were taken of the main details of the online assessment strategies. Later interviews were simply recorded in note form. In cases where interviews did not take place, phone and email contact was used to collect the required information.

Additionally, an email survey was sent to 16 academic staff across 9 universities to gain follow-up comments about the design and implementation of assessment on the internet. The survey asks for summaries of the most interactive features of courses, their integration with assessment, supports or constraints which operated during development and how technologies helped or hindered educational goals. Further surveys are being sent to academics who have been identified at overseas tertiary and vocational education institutions to supplement the Australian data.

Ethics clearances were obtained to interview and survey staff of Southern Cross University and other institutions. The questionnaire includes permissions to use the information received (with the exception of passwords and logins) in conference papers and towards a proposed book.

A small sample of cases collected were showcased at the 7th International WWW Conference in Brisbane (O'Reilly & Patterson, 1998).

Results of interviews

Interviews were used initially to identify online teaching, learning and assessment innovations within each institution. It became quickly apparent that the adoption of online strategies was not only to be found in open and distance learning contexts, but also that there was evident a general shift towards flexible learning options to all students regardless of their location.

Academic staff who were referred to within interviews were subsequently contacted by phone or email and interviewed wherever possible. Some case studies were obtained with no face to face meeting having occurred.

Results of email questionnaire

Initial research data from Australia shows that design and development of course materials for online teaching, learning and assessment was an individual pursuit in the past, especially with early adopters who began around mid 1980s. However, course design and development is seen as an iterative process and has increasingly become a team based and project based activity.

Online delivery has been part of a developing strategy in many institutions for enhancing flexible delivery. Initial moves were commonly a matter of replicating existing courses and materials in the new medium. It is now widely recognised that this is an inadequate response and has increasingly become the subject of institutional policy and practices. Support for developments has tended to come from external grants accrued in stages. Institutional changes in culture and infrastructure are now required to provide continued support for flexible learning initiatives.

Online assessment of student learning is now occurring across all levels of studies including undergraduate, postgraduate, professional development, industry training and vocational education. The same course products are being used for on-campus, off-campus and off-shore students. In some cases on-campus students are choosing not to attend, making it a false differentiation between modes of study and between levels of access to resources.

Discipline areas where online teaching, learning and assessment case studies can be found include education, business, social sciences, nursing, (environmental) infomatics, instructional technology and multimedia.

Features described which enhance interaction include electronic discussion forums, group email and bulletin boards, one-to-one email communication, simulations, quizzes, multiple choice and multimedia tests, collaborative web publishing, collaborative software development, collaborative

projects, formal online debates, team case studies, self assessment. Additional assessment strategies made possible by online technologies include peer assessment and international collaboration.

A proportion of case studies demonstrate enhancements to the formative (i.e.ungraded) assessment component of courses. Students are encouraged to practise their knowledge, skills and reflections in order to prepare for the graded assessment tasks. Feedback is either instantly available (CBL, CAL etc) or is turned around quickly by staff. Where online submissions are accepted for grading, they range from a minor weighting of 5% through to 100% of marks.

The range of strategies being trialed in online teaching, learning and assessment practices reflect a more learner-centered approach by allowing greater access to resources and interaction between a diverse (possibly international) cohort of students. Once available to students, online technologies increase flexibility in place, time and pace of study. The interactive and collaborative features of online learning also support social constructivism and are thus particularly useful for education, instructional technology subjects including infomatics, social sciences and postgraduate nursing.

Case study examples

1) 212-105 Science and Communication (University of Melbourne)

http://www.agfor.unimelb.edu.au/212-105/

Initial building of web page by students allows progress towards organising and running a scientific conference to occur online and to incrementally develop the website. Students are encouraged to put their papers online, review the papers of the peers and to continue using the site for linking useful resources including their own CV. Offered on campus with optional attendance. Developed and taught by Glyn Rimmington.

2) 212-205 Environmental Infomatics (University of Melbourne)

http://www.agfor.unimelb.edu.au/212-205/

Second year subject in same program as above, builds upon first year work, includes collaboration between years and involvement of second years in project planning online. Offered on campus with optional attendance. Developed and taught by Glyn Rimmington.

3) SMEC501 Foundations & Issues in Science, Maths & Technology Education (Curtin University of Technology)

http://www.curtin.edu.au/learn/unit/SMEC501/intro.htm

Part of the post graduate diploma, SMEC 501 is based upon constructivism and connected learning. Use of online discussion forums to share ideas and experiences from workplace contexts and in a democratic medium together with academic staff. Available off campus. Developed and taught by David Geelan.

4) SMEC612 Curricula in Science, Maths & Technology Education (Curtin University of Technology)

http://www.curtin.edu.au/learn/unit/smec612/intro.htm

Part of the Masters degree, SMEC 612 builds on the previous online unit by its emphasis upon

constructivism, connected learning and facilitating an online community of teachers. Available off campus. Developed and taught by David Geelan.

5) 499 Nursing Honours (Curtin University of Technology)

http://www.curtin.edu.au/learn/unit/Nursing Honours/index.html

Includes 40% of total assessment for participation in online discussion and contributions towards an online refereed professional journal. Off campus with three compulsory residentials. Developed and taught by Jill Downie.

6) 25314 Business Finance (University of Technology Sydney)

http://www.webcon.uts.edu.au/business/25314

Use of TopClass conferencing tool for management of large classes i.e. 1100 students. In order to sit the final exam (worth 65%), students are required to prove their competency in at least three out of six optional quizzes. Anonymous login available. On campus. Developed and taught by Mark Freeman.

7) Middle Eastern Politics Simulation (Macquarie University)

http://hardy.ocs.mq.edu.au/~control1/

An extended role play game conducted by email plus synchronous and asynchronous elements of a web site whereby students, divided into teams of two or three playing a Middle Eastern role, will respond to a likely scenario in order to further their interests. On campus simultaneously in six universities across four countries. Developed and taught by Andrew Vincent.

8) 10701 Communication and the Media (University of South Australia)

http://www-p.roma.unisa.edu.au/10701/index.htm

Individual and team work preparations for and completion of an online debate. Collaboration for each debate occurred between students from three international universities. Available both on campus and off campus. Developed and taught by Ingrid Day in collaboration with colleagues from Governors' State University, Georgia and University of Technology, Sydney.

9) ED017 Vocational Education and Training (Southern Cross University)

http://www.scu.edu.au/schools/sawd/pgonline/ED017

Includes parallel print and online assessment options. Online version utilises the fast turnaround of electronic medium for smaller and more frequent components of assessment. Fully off campus. Developed and taught by Lee Dunn.

It is hoped that by the conference date in July, further permissions will have been received from Canada, United Kingdom, New Zealand and South Africa to present additional case studies from overseas.

Discussion

Academic workload

Online assessment design requires significant consideration for the impact upon academic workload. Concerns have been expressed that while some online assessment activities have enhanced the learning environment, they are simply unsustainable in the longer term. This has particularly been the case for distance educators moving online, who must now deal with a significantly increased volume of individual communications from learners, and the facilitation of sometimes very large and active discussion lists.

Some staff in the cases listed, and others not listed, begin by undertaking a significant role in the development of study materials for online teaching and learning. After implementation and at times evaluation, development becomes the responsibility of a team. Team based development projects may now enhance the quality and integrity of the study materials as a package, but ultimately the responsibility for teaching and assessment remain with the academic subject specialist. This brings into question changes which may occur to academic work loads as a direct result of trialing a technology mediated assessment system.

Generalisability of adoption

In this context of potentially increased workload, it is not surprising to find that early adopters have been in the discipline areas for which the online medium is a more natural supplement to existing forms of course delivery. Case studies are reported from the disciplines of education, information technology and communication. Maintaining alignment in the online environment between objectives, teaching, learning and assessment has thus not been particularly onerous. The questions remain: will this translate to other discipline areas? and how? This highlights the need for a meaningful educational rationale for movement to online teaching rather than perceived economic or marketing imperatives.

Reliability in marking

While collaborative learning, group work and online discussion have been readily adopted as methods of online assessment, there is a range of concerns regarding reliability and consistency, as well as ascertaining performance of individuals within a group. These issues are not new to assessment, however in online environments there is sometimes less opportunity for teachers to observe and mediate these processes.

Authentication

How do we know whose work is being submitted for assessment? This is a familiar issue for distance educators, although a less familiar one for those who have relied on invigilated exams. In distance education, the use of incremental assignments and personalised or workplace projects have been used as a means of ensuring that students do their own work, and that teachers can familiarise themselves with individual students' work. For objective testing methods, such as multiple choice and short answer questions, utilising testing software, the issue is more thorny. US colleges who utilise this kind of testing frequently have resorted to photographic capture of the keyboard operator, and even iris scanning as a means of authentication. To address this issue effectively, it is suggested that educators need to reconceptualise their assessment methods rather than devise new methods of surveillance of students.

New models of assessment

The merging of formative and summative assessment processes appears to be an important outcome

of online assessment. The facility to provide speedy formative feedback in a series of incremental assessments which build upon each other, means that the critical formative function of assessment can be maximised.

While access to the internet is not available to all students, online assessment can still be used as either an optional formative activity or as one of the summative options. The broader range of assessment provided by online options allows learners to gravitate towards personal preferences e.g. team work, interaction via text, peer review, international collaboration etc. It may be that in a truly flexible program students will choose their subject, they will select the medium for delivery and participate in establishing the assessment tasks for themselves or the team, the marking criteria and the grades of student peers from around the world.

Conclusions

Case studies presented reveal state of the art practices in assessment using internet technology. Examples illustrate pedagogical, social, managerial and technical issues. Indications are that online technologies can add value to teaching, learning and assessment practices. These innovations can be applied to increase flexibility for all students regardless of their category of enrolment, be they on campus, off campus or off shore.

Discussion has considered theoretical, practical and technical issues from an educational design and development viewpoint. Further work needs to continue to apply the principles demonstrated by the best practice case studies as a broader range of discipline areas begins to adopt strategies for greater flexibility.

The issues raised here represent work in progress and reflect initial perceptions in a rapidly changing context. A more critical analysis of the design and teaching practices, and learning outcomes is necessary. With the addition of international case studies, this work will be used to contribute to a book on assessing learners in open, distance and flexible contexts.

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