



UniServe Science

Reading Supplements for

Symposium: Assessment in Science Teaching and Learning

September 28, 2008
The University of Sydney



UniServe Science has compiled this bibliography on assessment in science teaching and learning from the Web and the following journals:

- AJET: Australian Journal of Educational Technology
- ALT-J
- Assessment and Evaluation in Higher Education
- Bioscience Education E-journal
- British Journal of Educational Technology
- Cell Biology Education
- Educational Technology & Society
- HERD: Higher Education Research and Development
- Innovations in Education and Teaching International
- Journal of Chemical Education
- Journal of Computer Assisted Learning
- Journal of Educational Media
- Physics Education
- Planet
- Proceedings ASCILITE conference

References that relates to research in university science education and assessment published between 2004 and 2006

Bibliographies prepared for previous UniServe Science Conferences are available online from
<http://science.uniserve.edu.au/workshop/>

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Allain, R., Abbott, D. and Deardorff, D. (2006) Using peer ranking to enhance student writing. *Physics Education*, **41**, 255–258.

Abstract. What do we want our students to get out of the introductory physics course? Often these goals include improved conceptual understanding, improved critical thinking and improved writing and communication. These can be difficult goals to accomplish. One possible way to address these goals is through the use of peer ranking of student writing. In a peer ranking assignment, students not only answer a conceptual question but they also evaluate other students' answers. With a normal writing assignment, once students answer a question the students' involvement has ended. With a peer ranking assignment, students actively focus on both writing and physics.

Alsop, G. and Tompsett, C. (2004) Making sense of 'pure' phenomenography in information and communication technology in education. *ALT-J*, **12**(3), 241–259.

Abstract: Research in information and communication technology in education places an increasing emphasis on the use of qualitative analysis (QA). A considerable number of approaches to QA can be adopted, but it is not always clear that researchers recognize either the differences between these approaches or the principles that underlie them. Phenomenography is often identified by researchers as the approach they have used, but little evidence is presented to allow anyone else to assess the objectivity of the results produced. This paper attempts to redress the balance. A small-scale evaluation was designed and conducted according to 'pure' phenomenographic principles and guidelines. This study was then critiqued within the wider context of QA in general. The conclusion is that pure phenomenography has some procedural weaknesses, as well as some methodological limitations regarding the scope of the outcomes. The procedural weaknesses can be resolved by taking account of good practice in QA. The methodological issues are more serious and reduce the value of this approach for research in collaborative learning environments.

Beetham, H. (2005) e-Learning research: emerging issues?. *ALT-J*, **13**(1), 81–89.

Abstract: e-Learning research is an expanding and diversifying field of study. Specialist research units and departments proliferate. Postgraduate courses recruit well in the UK and overseas, with an increasing focus on critical and research-based aspects of the field, as well as the more obvious professional development requirements. Following this year's launch of a National e-Learning Research Centre, it is timely to debate what the field of study should be prioritising for the future. This discussion piece suggests that the focus should fall on questions that are both clear and tractable for researchers, and likely to have a real impact on learners and practitioners. Suggested questions are based on early findings from a series of JISC-funded projects on e-learning and pedagogy.

Boud, D. and Falchikov, N. (2006) Aligning assessment with long-term learning. *Assessment and Evaluation in Higher Education*, **31**(4), 339.

Abstract: Assessment in higher education is commonly held to contribute to feedback to students on their learning and the certification of their achievement. This paper argues that this short-term focus must be balanced against a longer-term emphasis for learning-oriented assessment to foster future learning after graduation. The paper proposes that students need to become assessors within the context of participation in practice, that is, the kinds of highly contextualised learning faced in life and work. It discusses the kinds of practices that are needed to refocus assessment within higher education courses to this end.

Bushell, G. (2006) Moderation of peer assessment in group projects. *Assessment and Evaluation in Higher Education*. **31**(1), 91.

B: It is shown here that a grade distribution scheme commonly used to moderate peer assessments where self assessment is excluded is based on a false premise and will give an erroneous ranking in the situation where the best performer in a student group ranks the second best performer much higher than the other group members. An alternative to normalisation is proposed based on the idea that the rank order of peer grades should be preserved and should as far as possible be consistent between assessors. It is shown that the method correctly recovers the rank order of students within the group for all cases examined, while still eliminating biases that can result from differences in marking standards in the group. It is suggested that the approach could also be used to check for bias when self assessment is included.



Byrnes, R. and Ellis, A. (2006) The prevalence and characteristics of online assessment in Australian universities. *Australasian Journal of Educational Technology*, **22**(1), 104–125.

Abstract: Assessment is one of the key elements of the teaching and learning process. It provides teachers with a means of evaluating the quality of their instruction. Students also use it to drive and direct their learning. Online teaching and learning will continue to become more important to Australian universities in order for them to remain competitive and economically viable. In the online environment, assessment is no less critical than in traditional face to face environments. However, assessment risks being overlooked or at least marginalised in the rush to place course content online. This paper provides a snapshot of the prevalence and characteristics of online assessment in Australian universities during 2004. It highlights useful information regarding the use of online assessment in the university sector and illustrates that overall this crucial area is not being given the attention or resources it requires.

Campbell, A. (2005) Application of ICT and rubrics to the assessment process where professional judgement is involved: the features of an e-marking. *Assessment and Evaluation in Higher Education*. **30**(5), 529.

Abstract: This paper describes a new ICT assessment tool that reduces multi-handling of marks, comments and scores specifically where professional judgement is involved. Whereas previous ICT applications in most fields of education have focused on student learning, this tool focuses on the lecturer task of the assessment process. Unlike many ICT based assessment tools, it enables the assessor to make and record professional judgements. This tool moves the marking/recording sheet off the desk and onto the desktop (computer screen). The aim in using the tool is to reduce the unproductive busy work of marking such as adding up of marks, recording, and spell checking of comments by hand, also it allow for many different views of the information, and to increase the time spent on feedback, reflection and moderation. The tool combines features of the word processor, spreadsheet and database applications, and paper-based marking. These features are described and discussed as working examples are presented. The paper also describes other features or possible uses of the tool, including the development and refinement of rubric-based scales; the recording of feedback by markers about the quality of the marking key during and after marking; the ability to compare one's marks with those of the coordinator electronically; the evaluating and analysing of results; and the printing out of many different views of the data

Campton, P. and Young, J. (2005) Please sir, may I have some more? A comparative study on student satisfaction with assessment feedback methods in an undergraduate unit. In *Balance, Fidelity, Mobility: Maintaining the Momentum, Proceedings of 2005 ASCILITE Conference*. [http://www.ascilite.org.au/conferences/brisbane05/blogs/proceedings/13_Campton.pdf]

Abstract There is an ongoing tension between the level and type of assessment feedback that University students seek and what is actually provided by lecturers. The demand for a learning environment which incorporates appropriate assessment feedback to students has to be balanced by the resources available to lecturers. The aim of this paper is to present a comparative analysis of the satisfaction of first year University of Tasmania Information Systems students with two different assessment feedback methods employed during 2005.

This study compares the level of satisfaction with existing assessment feedback methods that embed comments in the student's work with a semi-automated system, called AssessMate. This semi-automated system utilises analytical rubrics, automatic comments and levels of attainment to generate personalised Web pages for the students. Assessment and feedback were performed entirely online using WebCT VISTA for both methods. The resources required to manage the marking of assessment tasks were also analysed. Students were provided with feedback using two different methods for the first assignment and with only one feedback method for the second assignment, that being the semi-automated system, AssessMate. The level of satisfaction was then measured and compared. Factors such as access, ease of use, usefulness and attitude (satisfaction) were also considered. However, for the purposes of this paper the focus will be on attitude (satisfaction). The study has shown that there is no significant difference between the levels of attitude (satisfaction) based on the two forms of assessment feedback for particular types of assessment. An important finding was that there was a time saving of at least 25% in the marking process when using the semiautomated method. These findings may influence the assessment feedback methods adopted by lecturers for particular types of assessment as they seek to provide fair, fulsome and fast feedback with limited resources to large numbers of students.

Challis, D. (2005) Committing to quality learning through adaptive online assessment. *Assessment and Evaluation in Higher Education*, **30**(5), 519.

Abstract: With advances in computer-based technologies and the emergence of e-learning, there are unprecedented opportunities to reconsider assessment of learning (and, axiomatically, of teaching) and how this can be undertaken. One approach is adaptive assessment. Although it has existed in the tertiary environment since the time of the oral examination, advanced technologies allow much fuller exploitation of the possibilities inherent in a dynamic system of testing that responds to the user. Having described the characteristics of adaptive assessment, this paper considers how it can achieve significant pedagogical aims within the sector. The paper differentiates between adaptive assessment to assist learning and adaptive assessment to assess achievement. How adaptive assessment can be put in place and salient issues, such as security and system integrity, when such assessment is used for credit, are then discussed. The paper concludes that the capability exists but it has yet to be exploited within higher education as a viable approach to assessment and as a contributor to quality learning.

Chen-Chung Liu and Chun-Ming Tsai (2005) Peer assessment through web-based knowledge acquisition: tools to support conceptual awareness. *Innovations in Education and Teaching International*, **42**(1), 43–59.

Abstract: Web-based peer assessment is an innovative method that can be used to assess students' learning portfolios in order to improve their learning. However, students cannot easily compare their own evaluation schemes or think reflectively to improve their learning through web-based peer assessment if they do not understand how others perceive the assessment criteria. This study attempts to utilize knowledge acquisition techniques in order to elicit personal understanding of assessment criteria. Using repertory grid analysis, web-based peer assessment systems can elucidate personal conceptual frameworks and evaluation schemes when students use their own criteria to assess learning portfolios. The analysis provides an instrument for monitoring the students' conceptual frameworks--which may lead to different peer-teacher correlations regarding assessment. This instrument allows teachers and students to understand fully each other's conceptual frameworks and evaluation schemes--thereby allowing them to think reflectively and improve their learning.

Chen, C.-M., Hong, C.-M., Chen, S.-Y. and Liu, C.-Y. (2006). Mining Formative Evaluation Rules Using Web-based Learning Portfolios for Web-based Learning Systems. *Educational Technology & Society*, **9**(3), 69–87.

Abstract: Learning performance assessment aims to evaluate what knowledge learners have acquired from teaching activities. Objective technical measures of learning performance are difficult to develop, but are extremely important for both teachers and learners. Learning performance assessment using learning portfolios or web server log data is becoming an essential research issue in web-based learning, owing to the rapid growth of e-learning systems and real application in teaching scenes. The traditional summative evaluation by performing examinations or feedback forms is usually employed to evaluate the learning performance for both the traditional classroom learning and the web-based learning. However, summative evaluation only considers final learning outcomes without considering learning processes of learners. This study presents a learning performance assessment scheme by combining four computational intelligence theories, i.e., the proposed refined K-means algorithm, the neuro-fuzzy classifier, the proposed feature reduction scheme, and fuzzy inference, to identify the learning performance assessment rules using the web-based learning portfolios of an individual learner. Experimental results indicate that the evaluation results of the proposed scheme are very close to those of summative assessment results of grade levels. In other words, this scheme can help teachers to assess individual learners precisely utilizing only the learning portfolios in a web-based learning environment. Additionally, teachers can devote themselves to teaching and designing courseware since they save a lot of time in evaluating learning. This idea can be beneficially applied to immediately examine the learning progress of learners, and to perform interactively control learning for e-learning systems. More significantly, teachers could understand the factors influencing learning performance in a web-based learning environment according to the obtained interpretable learning performance assessment rules.

Chwen, J.C. (2006) The design, development and evaluation of a virtual reality based learning environment. *Australasian Journal of Educational Technology*, **22**(21), 39–63.

Abstract: Many researchers and instructional designers increasingly recognise the benefits of utilising three dimensional virtual reality (VR) technology in instruction. In general, there are two types of VR system, the immersive system and the non-immersive system. This article focuses on the latter system that merely uses the conventional personal computer setting. Although VR is recognised as an impressive learning tool, there are still



many issues that need further investigations. These include (i) identifying the appropriate theories and/or models to guide its design and development, (ii) investigating how its attributes are able to support learning, finding out whether its use can improve the intended performance and understanding, and investigating ways to reach more effective learning when using this technology, and (iii) investigating its impact on learners with different aptitudes. This project chose a learning problem that was related to novice car driver instruction, to study some aspects of these issues. Indeed, the study provided valuable insights to a feasible instructional design theoretical framework, as well as an instructional development framework for VR based learning environments. In addition, it also developed understanding of the educational effectiveness of such a learning environment and its effect on learners with different aptitude.

Clarke, S., Lindsay, K., McKenna, C. and New, S. (2004) INQUIRE: a case study in evaluating the potential of online MCQ tests in a discursive subject. *ALT-J*, **12**(3), 249–260.

Abstract: There has been a wealth of investigation into the use of online multiple-choice questions as a means of summative assessment, however the research into the use of formative MCQs by the same mode of delivery still remains patchy. Similarly, research and implementation has been largely concentrated within the Sciences and Medicine rather than the more discursive subjects within the Humanities and Social Sciences. The INQUIRE (Interactive Questions Reinforcing Education) Evaluation Project was jointly conducted by two groups at the University of Oxford—the Saïd Business School and the Academic Computing Development Team to evaluate the use of online MCQs as a mechanism to reinforce and extend student learning. This initial study used a small set of highly focused MCQ tests that were designed to complement an introductory series of first-year undergraduate management lectures. MCQ is a simple and well-established technology, and hence the emphasis was very much on situating the tests within the student experience. The paper will cover how the online MCQs are intended to fit into the Oxford Undergraduate study agenda, and how a simple evaluation was executed and planned to investigate their usage and impact. The chosen method of evaluation was to combine focus groups with automated online methods of tracking, and the paper discusses the findings of both of these.

Conole, G. and Warburton, B. (2005) A review of computer-assisted assessment. *ALT-J*, **13**(1), 17–31.

Abstract: Pressure for better measurement of stated learning outcomes has resulted in a demand for more frequent assessment. The resources available are seen to be static or dwindling, but Information and Communications Technology is seen to increase productivity by automating assessment tasks. This paper reviews computer-assisted assessment (CAA) and suggests future developments. A search was conducted of CAA-related literature from the past decade to trace the development of CAA from the beginnings of its large-scale use in higher education. Lack of resources, individual inertia and risk propensity are key barriers for individual academics, while proper resourcing and cultural factors outweigh technical barriers at the institutional level.

Davies, P. (2006) Peer assessment: judging the quality of students' work by comments rather than marks. *Innovations in Education and Teaching International*, **43**(1), 69–82.

Abstract: This paper reports the results of a study into the quality of peer feedback provided by students within a computerised peer-assessment environment. The study looks at the creation of a 'feedback index' that represents the quality of an essay based upon the feedback provided during a peer-marking process and identifies a significant positive correlation between this index and the average marks produced for an essay. The data produced are analysed in an attempt to ascertain whether specific groups of students, based upon their ability in developing an essay within this subject area, in general tend to mark and/or comment on their peers either too generously or too critically.

Davies, P. (2004) Don't write, just mark: the validity of assessing student ability via their computerized peer-marking of an essay rather than their creation of an essay. *ALT-J*, **12**(3), 261–277.

Abstract: This paper reports on a case study that evaluates the validity of assessing students via a computerized peer-marking process, rather than on their production of an essay in a particular subject area. The study assesses the higher-order skills shown by a student in marking and providing consistent feedback on an essay. In order to evaluate the suitability of this method of assessment in judging a student's ability, their results in performing this peer-marking process are correlated against their results in a number of computerized multiple-choice exercises and also the production of an essay in a cognate area of the subject being undertaken. The results overall show a correlation of the expected results in all three areas of assessment being undertaken, rated by the final grades of the

students undertaking the assessment. The results produced by quantifying the quality of the marking and commenting of the students is found to map well to the overall expectations of the results produced for the cohort of students. It is also shown that the higher performing students achieve a greater improvement in their overall marks by performing the marking process than those students of a lower quality. This appears to support previous claims that awarding a 'mark for marking' rewards the demonstration of higher order skills of assessment. Finally, note is made of the impact that such an assessment method can have upon eradicating the possibility of plagiarism.

Dobson, S. (2006) The assessment of student *PowerPoint* presentations--attempting the impossible? *Assessment and Evaluation in Higher Education*. **31**(1), 109.

Abstract: Assessing students through their *Microsoft PowerPoint* presentations might be thought to be impossible, a waste of time or a fascination with new technology which will pass sooner or later. However, to make a judgement on such assertions requires examining the strengths and weaknesses of such a form of assessment. Examples within an academic setting are few and far between, but this paper explores one such case--a *Microsoft PowerPoint* assessment used in an undergraduate Bachelor programme in Travel and Tourism in a Norwegian university college. The goal of this essay is to look at its validity, measured in terms of how well its empirical evidence and theoretical rationales support the adequacy of its inferences on assessment.

Downs, C. (2006) What should make up a final mark for a course? An investigation into the academic performance of first year Bioscience students. *Assessment and Evaluation in Higher Education*. **31**(3), 345.

Abstract: Performance of individual students in a tertiary level course is usually reflected in a final mark that determines their progress and transfer to higher courses. The contributions of different types of assessment to this final mark vary greatly within and between subjects in and between institutions. Performance of students in a first year course, Bioscience at the University of KwaZulu-Natal, Pietermaritzburg (UKZN) was assessed to determine if there were any patterns emerging in the broad components that contributed to the final mark, namely the coursework, theory and practical examinations. Performance of students was compared in Bioscience 110 for the years 1995-2000 using Repeated Measures ANOVA. Students performed best in coursework. All students performed poorly in the theory examinations. In addition differential performance between students, particularly the performance of sub-groups within the class was investigated. Of particular interest were English second language (ESL) students, and previous Science Foundation Programme (SFP) students. The latter are mainly previously disadvantaged Black students. All sub-groups of students showed similar trends in performance in Bioscience assessment tasks and final marks. However, the SFP students' final marks were lower than the other sub-groups, and showed a decreased performance for the same period. Most students, excluding SFP students, fell in the 50-59% category for the final Bioscience 110 marks obtained for the period 1995-2000. Theory examinations were investigated further, and were analysed in their component parts, namely multiple choice (MCQ), short questions and essay. Students performed best and consistently in MCQ. In contrast, students performed poorly in the short question and essay sections. Although the different ethnic sub-groupings showed similar trends in performance, the SFP students showed the poorest performance. In particular, they scored lowest in the theory examinations where they performed more poorly than the other sub-groupings in short questions and essays that require higher order cognitive skills. These patterns suggest that changes are required at the teaching, student and assessment interfaces.

Draffan, E.A. and Rainger, P. (2006) A model for the identification of challenges to blended learning. *ALT-J*, **14**(1), 55-67.

Abstract: A model for an inclusive approach to the identification of challenges to blended learning as a means to identify educational accessibility issues is presented. By focusing on both the learner and teacher perspectives, the model encompasses a broad range of factors, including learner characteristics, learning and teaching environments, interactions and activities. The proposed model provides a starting point for the identification of challenges to learning from a socio-cultural perspective rather than a medical or rehabilitation perspective. This holistic perspective is key to moving 'thinking' towards a more inclusive learning approach that embraces the needs of all learners, regardless of a defined disability.

Ellis, R.A., Calvo, R., Levy, D. and Tan, K. (2004) Learning through discussions. *Higher Education Research and Development*, **23**(1), 73-93.

Abstract: Students studying a third-year e-commerce subject experienced face-to-face and online discussions as an important part of their learning experience. The quality of the students' experiences of learning through those discussions is investigated in this study. This study uses qualitative approaches to investigate the variation in the students' understanding of what they were learning through discussions, and how they went about engaging in them.



Quantitative analyses are used to investigate how the students' experience related to their performance. Key outcomes of the study include that the quality of the students' experience of learning through discussions is positively related to their performance and that face-to-face and online discussions have qualitatively different benefits for learning.

Ferdig, R.E. (2006) Assessing technologies for teaching and learning: understanding the importance of technological pedagogical content knowledge. *British Journal of Educational Technology*, **37**(5), 749–760.

Abstract: Past and present research has provided evidence to support the claim that technologies for teaching and learning must be pedagogically sound. However, educational technologies are also part of a complex process involving the people in the implementation of the innovation. In this paper, I review existing research and explain what both of those claims entail for educational technology. In the remainder of the paper, I discuss the research agenda related to the need to provide evidence that technology innovations are successful in the implementation process. Implications of this three-part model as well as a discussion of the importance of technological pedagogical content knowledge conclude the paper.

Gioka, O. (2006) Assessment for learning in physics investigations: assessment criteria, questions and feedback in marking. *Physics Education*, **41**, 342–346.

Abstract. In this article I build on the review of research by Black and Wiliam which provided extensive evidence of the role of assessment *for* learning for raising standards in pupils' attainment. The purpose of the present empirical study was to explore the extent to which science teachers use assessment for learning practices when they teach physics investigations to 11–18 year-old pupils. Nine secondary science teachers in four schools in the greater London area were observed when they taught theory and physics investigations during one school year. They were also interviewed and pupils' written work was collected. The research findings show that only a few of the participating teachers implemented some elements of assessment for learning practices. Implications for the design of questions in the classroom and written feedback in marking are discussed. It is illustrated how teachers' questions and written feedback in marking need to be based on the cognitive demands of each investigation so that they support learning. I argue that teachers' decisions on how to support pupils to improve their attainment in physics education have to be informed by teachers' subject and 'pedagogical content' knowledge.

Hosie, P. Schibeci, R. and Backhaus, A. (2005) A framework and checklists for evaluating online learning in higher education. *Assessment and Evaluation in Higher Education*. **30**(5), 539.

Abstract: A case is made in this paper for using checklists and context-bound evaluations of online learning materials in higher education. Context-bound evaluations complement traditional forms of evaluation of educational courseware, such as checklists. Context-bound approaches are useful for indicating the pedagogical quality of online learning materials that may be productively used in conjunction with checklists to evaluate online learning. Edith Cowan University has developed a framework and checklists for assessing aspects of online pedagogical learning materials in higher education. These checklists, which are intended to be useful indicators of the areas where online learning materials are strong and to identify areas that may be deficient, and are a valuable screening and information gathering device to use when undertaking a context-bound evaluation of learning materials. As such, the quality of the instructional design remains an important consideration in evaluating courseware, and such information needs to be presented in a form that is accessible and useful for educational developers and researchers. Comment and dissent is invited on the value of contextual evaluations to reinvigorate the debate over appropriate ways of evaluating online learning materials in higher education.

Jones, R.E.J. and Cooke, L. (2006) A window into learning: case studies of online group communication and collaboration. *ALT-J*, **14**(3), 261–274.

Abstract: The two case studies presented explore the potential offered by in depth qualitative analysis of students' online discussion to enhance our understanding of how students learn. Both cases are used to illustrate how the monitoring and moderation of online student group communication can open up a 'window into learning', providing us with new insights into complex problem solving and thinking processes. The cases offer examples of students' 'thinking aloud' while problem solving, showing how and why they arrived at particular outcomes and the underlying thought processes involved. It is argued that these insights into students' learning processes can in turn offer us the opportunity to adapt our own teaching practice in order to achieve a better pedagogical 'fit' with the learning needs of our students; for example, through a more precise or more timely intervention. It is also suggested

that looking through this 'window' enables us to concentrate our assessment more closely on the *process* of task completion, rather than focusing solely on the end *product*.

Kamil Mahmood, A. and Ferneley, E. (2006) The use of animated agents in e-learning environments: an exploratory, interpretive case study. *ALT-J*, **14**(2), 153–168.

Abstract: There is increasing interest in the use of animated agents in e-learning environments. However, empirical investigations of their use in online education are limited. Our aim is to provide an empirically based framework for the development and evaluation of animated agents in e-learning environments. Findings suggest a number of challenges, including the multiple dialogue models that animated agents will need to accommodate, the diverse range of roles that pedagogical animated agents can usefully support, the dichotomous relationship that emerges between these roles and that of the lecturer, and student perception of the degree of autonomy that can be afforded to animated agents.

Kay R. H. (2006) Developing a comprehensive metric for assessing discussion board effectiveness. *British Journal of Educational Technology* **37**(5), 761–786.

Abstract: The use of online discussion boards has grown extensively in the past 5 years, yet some researchers argue that our understanding of how to use this tool in an effective and meaningful way is minimal at best. Part of the problem in acquiring more cohesive and useful information rests in the absence of a comprehensive, theory-driven metric to assess quality and effectiveness. Based on an extensive review of the research, the following variables were used to assess traditional discussion board use: thread, location of message within thread, author (student vs. educator), subject line clarity, time of posting, response time from previous message, number of times message was read, number of words, primary purpose, message quality, difficulty level of topic, knowledge level, processing level and use of external resources. These variables proved to be effective in assessing 12 key areas of discussion board use. It is argued that this kind of metric is essential if we wish to advance our understanding of online discussion boards for both educators and researchers.

Kearney, M. and Schick, S. (2006) Spotlight on authentic learning: Student developed digital video projects. *Australasian Journal of Educational Technology*, **22**(2), 189–208.

Abstract: The recent convergence of video and computer technologies presents new opportunities and challenges in education. Video production resources such as cameras and video editing software are now widely available in many schools and homes. The ease of use of these resources has encouraged teachers to use them across the curriculum with students of all ages. Furthermore, students often find this work exhilarating and perceive these tasks as deeply relevant and highly contextual. This paper probes the authentic nature of student developed video projects and builds on the literature relating to authentic learning with new educational technologies.

Kearse, T., Baruch, R. and Grobeld-Dahan, E. (2005) An evaluation of web enhanced instruction in college level biology courses. *Australasian Journal of Educational Technology*, **21**(4), 533–545.

Abstract: Websites that accompany science courses typically aim to provide easy access to learning materials, and to facilitate student-instructor communication. We tested whether these aims were achieved in two web enhanced, lower division undergraduate biology courses in an Israeli college. We collected data on the students' attitudes through pre- and post-course questionnaires, monitored their usage of the course websites, and related these data to the students' final course grades.

The students (n=96) accessed the websites frequently and regularly, and regarded them as important sources of information. About 47% of the students reported an increased level of general interest in the courses due to the websites. Students mainly downloaded lecture slides and exercise forms from the websites, but did not use the sites to communicate among themselves, or with the instructor. Final course grades were not correlated with the frequency of usage of the website. Female students had a more positive pre-course attitude towards the websites as compared with male students. However, there was no difference between men and women in usage of the course websites, and in achievement levels.

We conclude that the website component of the courses in our study facilitated delivery of learning materials and individual study, but not the social aspects of learning. We suggest that effective design of web enhanced courses can overcome this limitation by stressing social interactions and group learning during face to face sessions.



Kennedy, G. E. and Cutts, Q. I. (2005) The association between students' use of an electronic voting system and their learning outcomes. *Journal of Computer Assisted Learning*, **21**(4), 260.

Abstract: This paper reports on the use of an electronic voting system (EVS) in a first-year computing science subject. Previous investigations suggest that students' use of an EVS would be positively associated with their learning outcomes. However, no research has established this relationship empirically. This study sought to establish whether there was an association between students' use of an EVS over one semester and their performance in the subject's assessment tasks. The results from two stages of analysis are broadly consistent in showing a positive association between EVS usage and learning outcomes for students who are, relative to their class, more correct in their EVS responses. Potential explanations for this finding are discussed as well as modifications and future directions of this program of research.

Keppel, M., Au, E., Ma, A. and Chan, C. (2006) Peer learning and learning-oriented assessment in technology-enhanced environments. *Assessment and Evaluation in Higher Education*. **31**(4), 453.

Abstract: Group work, group projects and collaborative learning encourage students to learn from other students as well as from the lecturer. Peer learning may involve cooperation, communication and the giving and receiving of peer feedback. In addition peer learning emphasises the sharing of knowledge and ideas between students in a reciprocal partnership. However, some educators ask individual students to formally assess each other within the context of a group project which may inhibit the very process of peer learning that they are attempting to promote. This paper, through the voices of three lecturers and their students, has attempted to reinforce the importance of learning-oriented peer assessment within technology-enhanced environments. This paper advocates the concept of learning-oriented peer assessment strategies to enhance student learning.

Killi, K. (2005) Participatory multimedia learning: Engaging learners. *Australasian Journal of Educational Technology*, **21**(3), 303–322.

Abstract: The purpose of this paper is to present a participatory multimedia learning model for use in designing multimedia learning environments that support an active learning process, creative participation, and learner engagement. Participatory multimedia learning can be defined as learning with systems that enable learners to produce part of the learning materials themselves. The aim of the model is to represent the human information processing system more exhaustively than its predecessor, the cognitive theory of multimedia learning, and to support the transformation of free cognitive resources into a germane cognitive load needed for knowledge construction. Flow theory is used as a framework to facilitate positive user experience and engagement in order to maximise the impact of digital learning environments. The proposed model is studied through an educational game, IT-Emperor. In this game university level students ($n = 18$) worked in a virtual production company as trainees who were hired to produce learning material about usability. The focus of this paper is on studying the usefulness of participatory multimedia learning tasks included in IT-Emperor and factors that have an influence on flow experience. Questionnaires and interviews revealed that content creation was reported as the main activity causing flow. Additionally, a positive connection between flow and learning was found. Although these results support the proposed model, more research on the topic is recommended.

Klenowski, V., Askew, S. and Carnll, E. (2006) Portfolios for learning, assessment and professional development in higher education. *Assessment and Evaluation in Higher Education*. **31**(3), 267.

Abstract: This article focuses on the use of portfolios for learning and professional development in Higher Education (HE). Recent research findings related to learning and assessment help to contextualize the study. The use of portfolios for summative assessment and development of teaching and reflective practice dominates the literature. What is lacking is research that provides insights into how a portfolio for learning can be used in HE to develop understanding into one's own learning, assessment and professional practices. The action research findings related to portfolio use for learning purposes identified in the three case studies include: the importance of establishing the purpose of the portfolio; the impact of portfolio use on the approach to learning, to teaching and to professional development; the changes to professional practice brought about as a result of the learning; and the need to consider issues related to ethics and confidentiality.

Knight, P. (2006) The local practices of assessment. *Assessment and Evaluation in Higher Education*. **31**(4), 435.

Abstract: It is argued that assessment discourses are essentially local discourses. Assessment warrants, such as certificates and diplomas, are essentially local creations. They ought not to be treated as valid and reliable descriptions of general achievement. The case is developed by distinguishing between three forms of assessment and arguing that different forms of assessment support different degrees of confidence in our judgements of achievement.

Knight, J. K. and Wood, W. B. (2005) Teaching More by Lecturing Less. *Cell Biology Education*, **4**(4), 298–310.

Abstract: We carried out an experiment to determine whether student learning gains in a large, traditionally taught, upper-division lecture course in developmental biology could be increased by partially changing to a more interactive classroom format. In two successive semesters, we presented the same course syllabus using different teaching styles: in fall 2003, the traditional lecture format; and in spring 2004, decreased lecturing and addition of student participation and cooperative problem solving during class time, including frequent in-class assessment of understanding. We used performance on pretests and posttests, and on homework problems to estimate and compare student learning gains between the two semesters. Our results indicated significantly higher learning gains and better conceptual understanding in the more interactive course. To assess reproducibility of these effects, we repeated the interactive course in spring 2005 with similar results. Our findings parallel results of similar teaching-style comparisons made in other disciplines. On the basis of this evidence, we propose a general model for teaching large biology courses that incorporates interactive engagement and cooperative work in place of some lecturing, while retaining course content by demanding greater student responsibility for learning outside of class.

Lai, K.R., and Lan, C.H. (2006). Modeling Peer Assessment as Agent Negotiation in a Computer Supported Collaborative Learning Environment. *Educational Technology and Society*, **9**(3), 16–26.

ABSTRACT: This work presents a novel method for modeling collaborative learning as multi-issue agent negotiation using fuzzy constraints. Agent negotiation is an iterative process, through which, the proposed method aggregates student marks to reduce personal bias. In the framework, students define individual fuzzy membership functions based on their evaluation concepts and agents facilitate student-student negotiations during the assessment process. By applying the proposed method, agents can achieve mutually acceptable agreements that avoid the subjective judgments and unfair assessments. Thus, the negotiated agreement provides students with superior assessments, thereby enhancing learning effectiveness. To demonstrate the usefulness of the proposed framework, a web-based assessment agent was implemented and used by 49 information management students who submitted assignments for peer review. Experimental results suggested that students using the system had significantly improved learning performance over three rounds of peer assessment. Questionnaire results indicated that students believed that the assessment agent provided increased flexibility and equity during the peer assessment process.

Lancaster, T. and Tetlow, M. (2005) Does automated anti-plagiarism have to be complex? Evaluating more appropriate software metrics for finding collusion. In *Balance, Fidelity, Mobility: Maintaining the Momentum, Proceedings of the 2005 ASCILITE Conference*. [http://www.ascilite.org.au/conferences/brisbane05/blogs/proceedings/42_Lancaster.pdf]

Abstract Much research in the plagiarism detection literature relates to attempting to discover which students have copied student source code submissions from one another . a process commonly known as collusion. The majority of the collusion literature suggests that structure metrics (metrics that look beyond semantics to attempt to find disguise) are the most appropriate comparators for finding such collusion. This paper contrasts two paired structure metrics with a paired superficial metric, the metrics having been identified from the plagiarism detection literature. The metrics are compared on a corpus of Visual Basic source code, a programming language that has not been considered previously in the detection literature. The results find that the superficial metric considered, Lancaster word pairs, which calculates the proportion of consecutive words in common between two documents more accurately differentiates between collusion and coincidence and can be argued to be the most effective of the metrics. This suggests that the premise that structure metrics are the most appropriate methods for automated detection might need to be reconsidered.



Maclellan, E. (2004) Authenticity in assessment tasks: a heuristic exploration of academics' perceptions. *Higher Education Research and Development*, **23**(1), 19–33.

Abstract: This study was an exploration of the extent to which higher education tutors' perceptions of assessment were consistent with the construct of authenticity. Depth interviews with twelve academics sought views on what might constitute desirable assessment tasks and scoring methods to use with students. Summaries of transcribed interviews suggested that assessment should focus on real world problems and have some meaning to a real world audience. The results of the study are discussed in terms of constructivist perspectives in learning.

McAlpine, I. and Stothard, P. (2005) Course design and student responses to an online PBL course in 3D modelling for mining engineers *Australasian Journal of Educational Technology*, **21**(3), 335–354.

Abstract: To enhance a course in 3D Virtual Reality (3D VR) modelling for mining engineers, and to create the potential for off campus students to fully engage with the course, a problem based learning (PBL) approach was applied to the course design and all materials and learning activities were provided online. This paper outlines some of the theoretical background to online learning and PBL and its application to computer based courseware design and development. The application of this approach to the 3D VR modelling course is described. Evaluation data on student perceptions of the learning processes associated with PBL are included.

McCreary, C. L., Golde, M. F. & Koyeske, R. (2006) Peer Instruction in the general chemistry laboratory: Assessment of student learning. *Journal of Chemical Education*, **83**(5), 804.

Abstract: The Peer-Led Teaching and Learning (Workshop) model has been applied since 1998 to a subset of all General Chemistry laboratory sections at the University of Pittsburgh. McCreary et al report the first systematic comparison of conventional and workshop labs. A natural experiment proved possible because students sign up for labs without knowing the type of instruction they will receive.

McGuire, L. (2005) Assessment using new technology. *Innovations in Education and Teaching International*, **42**(3), 265-276.

Abstract: When we think about assessment using digital technologies, we often assume this means the introduction of computer-based tests. There are, however, other ways of using assessment for learning in which technology can play a useful and important role. This paper will discuss an innovative project, eVIVA, which uses mobile phones and the Internet to support formative assessment. The eVIVA project is currently being piloted by Ultralab, a learning and technology research unit at Anglia Polytechnic University, in schools across the UK. The initial pilot came to an end on 31 July 2003 but the project was then extended until July 2004. The chapter, reporting on the findings of the initial pilot, will discuss the development of the process, the responses of students and teachers to this new approach, and the implications of the project for developing a more student-centred approach to assessment and learning, and how this might impact on higher education.

Muller-Kalthoff and Moller, J. (2006) Browsing while reading: effects of instructional design and learners' prior knowledge. *ALT-J*, **14**(2), 183–198.

Abstract: One of the key reasons that multimedia, and particularly hypertext systems, are gaining in importance is that they inspire hopes of optimizing learners' processes of knowledge construction. The present study is concerned with the respective influence of individual learner variables (i.e. particularly domain-specific prior knowledge) on the use of different design attributes. Thirty-six university students worked through a hierarchically structured two-part hypertext about the psychology of memory under two experimental browsing conditions (reduced versus free browsing). Results show that deeper-level comprehension (i.e. structural knowledge) was predicted by the interaction of experimental condition and prior knowledge, but that simply retaining facts was not. Participants with low prior knowledge performed better on the comprehension test if they had worked on the version with reduced access. Moreover, the version with reduced access helped to reduce feelings of disorientation. The measure of disorientation also appeared to be closely linked with the individual's computer experience, self-concept of computer ability and subject-related interest. The main implications for educational practice relate to the design of an adaptive multimedia and hypertext learning system and the successful learning with it.

Morimoto, Y., Ueno, M., Kikukawa, I., Yokoyama, S. and Miyadera, Y. (2006). Formal Method of Description Supporting Portfolio Assessment. *Educational Technology and Society*, **9**(3), 88–99.

Abstract: Teachers need to assess learner portfolios in the field of education. However, they need support in the process of designing and practicing what kind of portfolios are to be assessed. To solve the problem, a formal method of describing the relations between the lesson forms and portfolios that need to be collected and the relations between practices and these collected portfolios was developed. These relations are indispensable in portfolio assessment. A support system for these based on the formal method was also developed. As the formal method of description can precisely and consistently describe these relations, the system makes it possible to support the assessment of portfolios in the design and practice phases.

Murphy, E. and Ciszewska-Carr, J. (2005) Contrasting syntactic and semantic units in the analysis of online discussions. *Australasian Journal of Educational Technology*, **21**(4), 546–566.

Abstract: This paper reports on a study which contrasts results obtained using semantic and syntactic units of analysis in a context of content analysis of an online asynchronous discussion. The paper presents a review of literature on both types of units. The data set consisted of 80 messages posted by ten participants in an online learning module. Data were coded twice by two coders working independently. In the first instance, each coder divided all messages into semantic units and then coded those units. The second coding was conducted on the basis of a syntactic unit of a paragraph. Analysis at the level of the whole group showed little difference in results between the two types of coding. At the level of individual participants, those differences were greater. Results are discussed within a framework of reliability, capability of the unit to discriminate between behaviors, feasibility of different units, and their identifiability. Implications for research are discussed.

Nasser, F., and Fresko, B. (2006) Predicting student ratings: the relationship between actual student ratings and instructors' predictions. *Assessment and Evaluation in Higher Education*. **31**(1), 1.

Abstract: This study examined the relationship between student ratings and instructors' predictions of these ratings, taking into account other instructor, student, and course characteristics. Participants in the study were 198 instructors in the School of Education at a major teacher training college in Israel. Data corresponding to one randomly selected course per instructor were collected using student and instructor questionnaires and college records. Results indicate a systematic positive relationship between instructors' predictions and actual student ratings with respect to overall ratings and the ratings of three dimensions of teaching. Results also demonstrate a systematic trend whereby low-rated instructors tend to overestimate their student ratings, high-rated instructors underestimated ratings, and moderately rated instructors gave accurate predictions. Results have implications for using predictions to motivate teaching improvement.

Oliver, R. (2005) Quality assurance and e-learning: blue skies and pragmatism. *ALT-J*, **13**(3), 173–187.

Abstract: This paper considers the role of quality assurance in e-learning; reflecting on the conditions necessary for successful e-learning. It reviews some of the current international work on quality assurance in this area and goes on to consider the ways in which the quality of a process or activity can be assessed—focusing on the use of benchmarking and specification of standards.

Penwell, R.A., Elsawa, S.F. and Pitzer, T. (2004) Cooperative and Active Learning in Undergraduate Biological Laboratories at FIU – Implications to TA Teaching and Training. *Bioscene: Journal of College Biology Teaching*, **30**(2), 9–12.

Abstract: There were several changes in the laboratory teaching program in the biological Sciences at Florida International University (FIU) between 1993-1994. The underlying goal was the improvement of the amount of material learned and retained by the students, but these changes showed little positive improvement. It was deemed necessary for FIU to incorporate a completely different, well-research approach. At the time of these implemented changes it became apparent that Teaching Assistant (TA) training and development necessitated a restructuring that would involve the instructor on a more cognitive and interactive level with the students. Therefore the goal for FIU was to prepare the TAs with a general pedagogical construct that would require a higher level of instructional and collaborative training in order to help improve student learning and retention of materials presented in the laboratory teaching program. The five basic constructs of cooperative learning were employed and the results proved to be of significant benefit to both the TAs and the students in their classes.



Pogacnik, L. and Cigic, B. (2006) How to motivate students to study before they enter the lab. *Journal of Chemical Education*, **83**(7), 1094.

Abstract: Laboratory exercises constitute an important part of chemical and biochemical courses at the university level. Nevertheless, students frequently are insufficiently prepared for the practical work, which often reduces their work to the level of a technician. A system designed to motivate students to study prior to the laboratory exercise was introduced. Initial sessions and preliminary tests were held prior to the exercises. As a consequence students studied more before the exercise than in the previous system. The time burden for students was not considerably increased, since the reports were shortened and written immediately after the exercise. Communication between students and teaching assistants, which was also a weak point of the previous system, improved. Students performed significantly better on the final exam and exhibited a positive attitude towards the changes.

Ricketts, C. and Zakrzewski, S. (2005) A risk-analysis approached to implementing web-based assessment. *Assessment and Evaluation in Higher Education*. **30**(6), 603.

Abstract: Computer-Based Assessment is a risky business. This paper proposes the use of a model for web-based assessment systems that identifies pedagogic, operational, technical (non web-based), web-based and financial risks. The strategies and procedures for risk elimination or reduction arise from risk analysis and management and are the means by which the quality of the system is measured. A comparison is made between the severity of risks for non-web based systems and web-based systems.

Roschelle, J., Penuel, W. R., Yarnall L., Shechtman N. and Tatar, D. (2005) Handheld tools that 'Informate' assessment of student learning in Science: a requirements analysis. *Journal of Computer Assisted Learning*, **21**(3), 149–153.

Abstract: An important challenge faced by many teachers as they involve students in science investigations is measuring ('assessing') students' progress. Our detailed requirements analysis in a particular school district led to the idea that what teachers need most are ways to increase the quality of the information they have about what students know and can do, not automation of typical assessment practices. We see handheld computers as promising tools for addressing this need because they can give students and teachers frequent, integral access to new ways of expressing and communicating what they know and can do. Our requirements analysis has led us to emphasize a need for handheld-based tools that 'informate' science instruction by:

- Being oriented to the needs of teachers in transition to inquiry-oriented pedagogy;
- expanding the range of assessment tasks through a new representational medium and communication infrastructure;
- creating new roles for students in expressing what they know and can do; and
- focusing both students' and teachers' attention on scientific concepts.

Russell, J., Elton, L., Swinglehurst, D. and Greenhalgh, T. (2006) Using the online environment in assessment for learning: a case-study of a web-based course in primary care. *Assessment and Evaluation in Higher Education*, **31**(4), 465.

Abstract: The development of e-learning has opened up new opportunities for innovation in assessment practices in higher education. This descriptive case study draws upon staff and student experiences of teaching and learning on a web-based Masters programme in primary health care to explore how specific features of the online environment can be exploited to promote assessment as part of learning. It begins by identifying different ways of conceptualising assessment in order to highlight the fundamental value choices facing those developing and delivering assessment systems, and then describes our own approach to assessment. In the second part of the paper we explore two key ways in which the online learning environment enables assessment to contribute to learning--through its potential to support collaborative learning, and through facilitating high quality feedback between teachers and students.

Rutter, M. (2006) Tutorial chat: a case study of synchronous communication in a learning environment. *ALT-J*, **14**(2), 169–181.

Abstract: This case study describes the use of a web-based synchronous chat application, run during computing tutorials. The chat room was moderated by a paid demonstrator, who assisted and encouraged students whenever possible. Most of the discussion was banter, which acted as a lubricant for relevant factual communication. Students were permitted a degree of anonymity, but nevertheless learned to treat the facility in a useful manner. The

application and its mode of employment were found to be both motivating and supportive. Use was evaluated by questionnaire and an analysis of student input. As a result of the experience, it is suggested that abuse will certainly occur and may be minimised by technical improvements, but never eliminated. The Rogerian approach adopted was found to have transferred emphasis from teaching a topic to the learning of generic skills.

Salmon, S. (2005) Flying not flapping: a strategic framework for e-learning and pedagogical innovation in higher education institutions. *ALT-J*, **13**(3), 201–218.

Abstract: E-learning is in a rather extraordinary position. It was born as a ‘tool’ and now finds itself in the guise of a somewhat wobbly arrow of change. In practice, changing the way thousands of teachers teach, learners learn, innovation is promoted and sustainable change in traditional institutions is achieved across hundreds of different disciplines is a demanding endeavour that will not be achieved by learning technologies alone. It involves art, craft and science as well as technology. This paper attempts to show how it might be possible to capture and model complex strategic processes that will help move the potential of e-learning in universities to a new stage of development. It offers the example of a four-quadrant model created as a framework for an e-learning strategy.

Sclater, N. and MacDonald, M. (2004) Putting interoperability to the test: building a large reusable assessment item bank. *ALT-J*, **12**(3), 205–213.

Abstract: The COLA project has been developing a large bank of assessment items for units across the Scottish further education curriculum since May 2003. These will be made available to learners mainly via colleges' virtual learning environments (VLEs). Many people have been involved in the development of the COLA assessment item bank to ensure a high level of technical and pedagogical quality. Processes have included deciding on appropriate item types and subject areas, training authors, peer-reviewing and quality assuring the items and assessments, and ensuring they are tagged with appropriate metadata. One of the biggest challenges has been to ensure that the assessments are deliverable across the four main virtual learning environments in use in Scottish colleges--and also through a stand-alone assessment system. COLA is significant because no other large project appears to have successfully developed standards-compliant assessment content for delivery across multiple VLEs. This paper discusses how COLA has dealt with the organizational, pedagogical and technical issues which arise when commissioning items from many authors for delivery across an educational sector.

Sharp, S. (2006) Deriving individual student marks from a tutor's assessment of group work. *Assessment and Evaluation in Higher Education*. **31**(3); 329.

Abstract: The use of group work, in which three or more students jointly produce a piece of work for summative assessment, is an established aspect of teaching and learning in higher education. Opinions vary however about whether their marks should vary according to the respective contributions they made to the work. This paper is based on the assumption that if adjustments are to be made, they should be made on sound statistical grounds. Current methods for adjusting student marks do not allow the size of the adjustments to be controlled and empirical data are presented which show that very large adjustments can occur. This paper presents a method for deriving final student marks from a single tutor mark and ratings which students make of each other's contributions. The method incorporates a mechanism for directly controlling the size of the adjustments made. It is demonstrated using data from students following a degree programme in computing. A spreadsheet has been written which undertakes the calculations necessary to apply the method.

Sharpe, R., Benfield, G.. and Francis, R. (2006) Implementing a university e-learning strategy: levers for change within academic schools. *ALT-J*, **14**(2), 135–151.

Abstract: This paper describes the implementation of an e-learning strategy at a single higher education institution in terms of the levers used to promote effective uptake and ensure sustainable embedding. The focus of this work was at the level of the academic school using a range of change practices including the appointment of school-based learning technologists and e-learning champions, supporting schools to write their own strategies, a pedagogical framework of engaging with e-learning, and curriculum development and evaluation of school-supported projects. It is clear that the implementation of the e learning strategy has led to a large and increasing proportion of our students experiencing blended learning. In addition, there are initial indications that this has enhanced some learning and teaching processes. Where there has been sustainable embedding of effective e-learning, the following levers were identified as particularly important: flexibility in practices that allow schools to contextualise their plans for change, the facilitation of communities of key staff and creating opportunities for staff to voice and challenge their beliefs about e-learning.



Sim, G. and Holifield, P. (2004) Implementation of computer assisted assessment: lessons from the literature. *ALT-J*, **12**(3), 215–229.

Abstract: This paper draws attention to literature surrounding the subject of computer-assisted assessment (CAA). A brief overview of traditional methods of assessment is presented, highlighting areas of concern in existing techniques. CAA is then defined, and instances of its introduction in various educational spheres are identified, with the main focus of the paper concerning the implementation of CAA. Through referenced articles, evidence is offered to inform practitioners, and direct further research into CAA from a technological and pedagogical perspective. This includes issues relating to interoperability of questions, security, test construction and testing higher cognitive skills. The paper concludes by suggesting that an institutional strategy for CAA coupled with staff development in test construction for a CAA environment can increase the chances of successful implementation.

Smith, A.C., Stewart, R., Shields, P., Hayes-Klosteridis, J., Robinson, P. and Yuan, R. (2005) Introductory Biology Courses: A Framework to Support Active Learning in Large Enrollment Introductory Science. *Cell Biology Education*, **4**(2), 143–156.

Abstract: Active learning and research-oriented activities have been increasingly used in smaller, specialized science courses. Application of this type of scientific teaching to large enrollment introductory courses has been, however, a major challenge. The general microbiology lecture/laboratory course described has been designed to incorporate published active-learning methods. Three major case studies are used as platforms for active learning. Themes from case studies are integrated into lectures and laboratory experiments, and in class and online discussions and assignments. Students are stimulated to apply facts to problem-solving and to learn research skills such as data analysis, writing, and working in teams. This course is feasible only because of its organizational framework that makes use of teaching teams (made up of faculty, graduate assistants, and undergraduate assistants) and Web-based technology. Technology is a mode of communication, but also a system of course management. The relevance of this model to other biology courses led to assessment and evaluation, including an analysis of student responses to the new course, class performance, a university course evaluation, and retention of course learning. The results are indicative of an increase in student engagement in research-oriented activities and an appreciation of real-world context by students.

Smith, G.G. and Ferguson, D. (2005) Student attrition in mathematics e-learning. *Australasian Journal of Educational Technology*, **21**(3), 323–334.

Abstract: Qualitative studies indicate that mathematics does not work well in e-learning. The current study used quantitative methods to investigate more objectively the extent of problems with mathematics in e-learning. The authors used student attrition as a simple measure of student satisfaction and course viability in two studies, one investigating attrition in e-learning and a second comparison study of attrition in face to face courses. In e-learning, attrition (drop out rate) was significantly higher for math courses versus non-math. For face to face courses, attrition rates for math versus non-math courses were nearly equal. The authors suggest reasons for high student attrition in math e-learning. Online student populations are different from their face to face peers. E-learning systems are poorly adapted to mathematics.

Taras, M. (2006) Do unto others or not: equity in feedback for undergraduates. *Assessment and Evaluation in Higher Education*. **31**(3), 365.

Abstract: This article argues that the mechanisms and research culture that support university academics when writing articles for publication in an iterative feedback cycle, and which are within the tenets of good pedagogic principles of formative assessment and feedback (Sadler, 1989), are often missing to support undergraduate students in their learning. The reasons for this are mainly historical. Generally, this process is only available in universities at postgraduate level, as undergraduates tend not to be included in this type of learning culture. This is exacerbated because of the exclusion of undergraduates from assessment processes, which would help them to understand and assimilate the feedback on their work. Data collected from validated documentation of undergraduate programmes at a new English university were used to attempt to quantify possible feedback available to students and their access to assessment.

Thin, A.G. (2006) Using online microassessments to drive student learning. *Bioscience Education eJournal*, **7**. [<http://www.bioscience.heacademy.ac.uk/journal/vol7/beej-7-7.htm>].

Abstract: It is not what is taught that has the most influence on students' study behaviour, but rather what is assessed. Computer-assisted assessment offers the possibility of widening the scope of the material that is assessed, without placing excessive burdens on either staff or students. This article describes a computer-assisted assessment scheme comprising frequent, short, focused online assessments — termed “Microassessment”. It was designed and implemented with the primary aim of increasing the time students spent engaging with the learning activities of a module which was the second in a series of three introductory human anatomy and physiology modules. The impact of the introduction of the microassessments was evaluated by comparing results in the written end of module exam with the exam performance in the other two modules, where the continuous assessment tasks involved submitting completed workbooks at the end of each of the modules. The introduction of the microassessments resulted in a demonstrable improvement in the end of module exam performance and provides evidence in support of this specific pattern of continuous assessment as having a significant impact on student learning.

Tomanek, D. and Montplaisir, L. (2004) Students' Studying and Approaches to Learning in Introductory Biology. *Cell Biology Education*, **3**(4), 253–262.

Abstract: This exploratory study was conducted in an introductory biology course to determine 1) how students used the large lecture environment to create their own learning tasks during studying and 2) whether meaningful learning resulted from the students' efforts. Academic task research from the K–12 education literature and student approaches to learning research from the postsecondary education literature provided the theoretical framework for the mixed methods study. The subject topic was cell division. Findings showed that students 1) valued lectures to develop what they believed to be their own understanding of the topic; 2) deliberately created and engaged in learning tasks for themselves only in preparation for the unit exam; 3) used course resources, cognitive operations, and study strategies that were compatible with surface and strategic, rather than deep, approaches to learning; 4) successfully demonstrated competence in answering familiar test questions aligned with their surface and strategic approaches to studying and learning; and 5) demonstrated limited meaningful understanding of the significance of cell division processes. Implications for introductory biology education are discussed.

Ulicsak, M. H. (2004) ‘How did it know we weren't talking?’ An investigation into the impact of self-assessments and feedback in a group activity. *Journal of Computer Assisted Learning*, **20**(3), 205.

Abstract: The paper describes a model designed to support the development of children's group skills by explicitly scaffolding reflection on collaboration and providing feedback using the children's self-assessment of these skills. The model incorporates existing training schemes, including procedural prompting, assigning roles, modelling exchanges, and giving feedback. This paper then reports a study that compared 9 and 10-year-old children who used a computer-based implementation of this model ($n=26$) with children who did not use the system ($n=25$). The study found: a trend for improved recall of material studied, that the children believed the computer assessment of group skills used was correct, and finally, the time spent reflecting on their group behaviour increased when the children thought they were being observed by the system. The implications of these findings are discussed.

Van den Berg, I., Admiraal, W. and Pilot, A. (2006) Peer assessment in university teaching: evaluating seven course designs. *Assessment and Evaluation in Higher Education*. **31**(1), 19.

Abstract: Peer assessment is understood to be an arrangement with students assessing the quality of their fellow students' writings and giving feedback to each other. This multiple-case study of seven designs of peer assessment focuses on the contribution of peer assessment to the acquisition of undergraduates' writing skills. Its aim is to arrive at an optimal design of peer assessment. Factors included in this study are: the quality of peer assessment activities, the interaction between students in oral peer feedback, students' learning outcomes, and their evaluation of peer assessment. Most students took assessing the work of their fellow students seriously, and included the peer feedback in the revision of their work. In most conversations, students provided feedback in an evaluative manner. In others, the interaction was more exploratory. For peer assessment, we recommend a combination of written and oral peer feedback.



Warn J (2006) Plagiarism software: no magic bullet! *Higher Education Research and Development*, **25**(2), 195–208.

Abstract: The ready availability of Internet resources has made it easier than ever for students to plagiarise and many higher education institutions have resorted to checking essays with plagiarism detection software. Student behaviour is likely to change in response to this increased scrutiny but not necessarily in the desired direction. Internet technology facilitates a ‘cut and paste’ assembly-line approach to essay writing that will persist despite the use of plagiarism software. It is predicted that students will resort to increased use of paraphrase in order to drop below the radar of the detection software. To illustrate this trend, samples of student essays are analysed and limitations of plagiarism software discussed. The paper concludes with suggestions for developing a coordinated institutional policy on plagiarism, and recommends that policy encompass training and educational initiatives to complement any enforcement strategy using plagiarism software.

Wheater, C.P., Langan, A.M. and Dunleavy, P.J. (2005) Students assessing students: case studies on peer assessment. *Planet*, **15**.

Abstract: Peer-assessment can be viewed in many ways: from a tool for reflection by students to a method of reducing staff marking loads. When deciding whether to use peer-assessment, several questions arise. Can naïve inexperienced markers evaluate their peers? What factors influence student assessors? Should you ‘pass on’ your marking to students? This article considers current issues about peer-assessment by discussing preliminary findings from two current projects.

Weaver, M. (2006) Do students value feedback? Student perceptions of tutors’ written responses. *Assessment and Evaluation in Higher Education*. **31**(3), 379.

Abstract: The topic of feedback to students is an under-researched area, and there has been little empirical research published which focuses on student perceptions. This study explores student perceptions of written feedback and examines whether feedback received demonstrated a student-centred approach to learning. A multi-method approach of qualitative and quantitative data collection and analysis was used to survey 44 students in the faculties of Business and Art & Design. Student responses show feedback is valued, but believed tutor comments could be more helpful. Survey results indicate that students may need advice on understanding and using feedback before they can engage with it. Content analysis of feedback samples and student responses uncovered four main themes of feedback considered unhelpful to improve learning: comments which were too general or vague, lacked guidance, focused on the negative, or were unrelated to assessment criteria. It is suggested that by focusing on messages conveyed by their writing, providing feedback set in the context of assessment criteria and learning outcomes, and by ensuring that it is timely, tutors could greatly improve the value of feedback.

Wheeler, S., Kelly, P. and Gale, K. (2005) The influence of online problem-based learning on teachers’ professional practice and identity. *ALT-J*, **13**(2), 125–137.

Abstract: In this paper we describe the design of a managed learning environment called MTutor, which is used to teach an online Masters Module for teachers. In describing the design of MTutor pedagogic issues of problem-based learning, situated cognition and ill-structured problems are discussed. MTutor presents teachers with complex real-life teaching problems, which they are required to solve online through collaboration with other teachers. In order to explore the influence of this online learning experience on the identity and practice of teachers, we present the results from a small-scale study in which six students were interviewed about their online experiences. We conclude that, within the sample, students’ engagement with online problem-based learning within their community of practice positively influenced their professional practice styles, but that there is little evidence to suggest that online identity influences real-life practice.

Williams, J.B. (2006) Assertion-reason multiple-choice testing as a tool for deep learning: a qualitative analysis. *Assessment and Evaluation in Higher Education*. **31**(3), 287.

Abstract: This paper reflects on the ongoing debate surrounding the usefulness (or otherwise) of multiple-choice questions (MCQ) as an assessment instrument. The context is a graduate school of business in Australia where an experiment was conducted to investigate the use of assertion-reason questions (ARQ), a sophisticated form of MCQ that aims to encourage higher-order thinking on the part of the student. It builds on the work of Connelly (2004) which produced a quantitative analysis of the use of ARQ testing in two economics course units in a flexibly-delivered Master of Business Administration (MBA) program. Connelly's main findings were that ARQ tests were good substitutes for the more conventional type of multiple-choice/short-answer type questions and, perhaps more



significantly, ARQ test performance was a good predictor of student performance in essays--the assessment instrument most widely favoured as an indicator of deeper learning. The main focus of this paper is the validity of the second of these findings, analysis of questionnaire data casting some doubt over whether student performance in ARQ tests can, indeed, be looked upon as a sound indicator of deeper learning--student reactions and opinions suggesting instead that performance might have more to do with one's proficiency in the English language.

Yin, P.-Y., Chang, K.-C., Hwang, G.-J., Hwang, G.-H., and Chan, Y. (2006). A Particle Swarm Optimization Approach to Composing Serial Test Sheets for Multiple Assessment Criteria. *Educational Technology & Society*, **9**(3), 3–15.

Abstract: To accurately analyze the problems of students in learning, the composed test sheets must meet multiple assessment criteria, such as the ratio of relevant concepts to be evaluated, the average discrimination degree, difficulty degree and estimated testing time. Furthermore, to precisely evaluate the improvement of student's learning performance during a period of time, a series of relevant test sheets need to be composed. In this paper, a particle swarm optimization-based approach is proposed to improve the efficiency of composing near optimal serial test sheets from very large item banks to meet multiple assessment criteria. From the experimental results, we conclude that our novel approach is desirable in composing near optimal serial test sheets from large item banks and hence can support the need of evaluating student learning status.