



UniServe Science

Reading Supplement for

First Year Experience Discussion Forum: Assessment
and
Symposium: Blended Learning in Science Teaching and Learning

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UniServe Science has compiled this bibliography on assessment and blended learning from the Web and the following books and journals:

- AJET: Australian Journal of Educational Technology
- Assessment and Evaluation in Higher Education
- Computer, Informatics, Nursing
- Educational Technology & Society
- HERD: Higher Education Research and Development
- IEEE International Conference on Advanced Learning Technologies
- iJMEST: International Journal of Mathematical Education in Science and Technology
- Internet in Higher Education
- Journal of Educational Media
- Journal of Statistics Education
- Learning, Media & Technology
- Learning solutions E-magazine
- Open Learning
- Planet
- Proceedings ASCILITE conference
- Proceedings of NAWeb, The Web-based Learning Conference

References relate to research in university science education and assessment published in 2004 and 2005

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

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Anohina, A. (2005) Analysis of the terminology used in the field of virtual learning. *Educational Technology & Society*, **8**(3), 91-102.

The broad terminology describing possible learning ways and approaches that use various technologies in the learning process has appeared together with rapid growth of information and communication technologies. This terminology should be ordered and precisely defined. This article presents eight groups of the most widespread terms (such as computer-based learning, distance learning, e-learning, Internet-based learning, online learning, resource-based learning, technology-based learning, Web-based learning) and defines subset relationships among the groups. In addition the meaning of some terms coming from pedagogy (education, instruction, learning, teaching, training, and tutoring) and used as obligatory constituent part of other terms is clarified.

Armitage, G. and Harrop, W. (2005) Teaching IP networking fundamentals in resource constrained educational environments. *Australasian Journal of Educational Technology*, **21**(2), 263-283.

Many educational institutions suffer from a lack of funding to keep telecommunications laboratory classes up to date and flexible. This paper describes our Remote Unix Lab Environment (RULE), a solution for exposing students to the latest Internet based telecommunications software tools in a Unix like environment. RULE leverages existing PC laboratories (often based on Microsoft's Windows) to enable student access to Internet Protocol (IP) networked hosts for telecommunications coursework and research projects. Re-use of existing PC labs substantially decreases the cost of introducing hands on teaching of Unix based Internet services into curricula. We discuss our experiences of deploying, using and provisioning RULE since early 2003. RULE itself is a handful of FreeBSD hosts, mounted in a small back room, utilising FreeBSD's "jail" functionality to create multiple virtual hosts.

Augar, N., Raitman, R. and Zhou, W. (2004) Teaching and learning online with wikis. In R. Atkinson, C. McBeath, D. Jonas-Dwyer & R. Phillips (Eds), *Beyond the comfort zone: Proceedings of the 21st ASCILITE Conference* (95-104). Perth, 5-8 December. <http://www.ascilite.org.au/conferences/perth04/procs/augar.html>.

Wikis are fully editable websites; any user can read or add content to a wiki site. This functionality means that wikis are an excellent tool for collaboration in an online environment. This paper presents wikis as a useful tool for facilitating online education. Basic wiki functionality is outlined and different wikis are reviewed to highlight the features that make them a valuable technology for teaching and learning online. Finally, the paper discusses a wiki project underway at Deakin University. This project uses a wiki to host an icebreaker exercise which aims to facilitate ongoing interaction between members of online learning groups. Wiki projects undertaken in America are outlined and future wiki research plans are also discussed. These wiki projects illustrate how e-learning practitioners can and are moving beyond their comfort zone by using wikis to enhance the process of teaching and learning online.

Bangert, A. (2004) The Seven Principles of Good Practice: A Framework for evaluating on-line teaching. *Internet in Higher Education*, **7**(3), 217-232.

Traditionally, campus-based courses rely on student evaluations to provide instructors with feedback about their teaching effectiveness. However, current instructor evaluation instruments do not tap the essential teaching practices recommended for effective on-line teaching. This exploratory study used the Seven Principles of Good Practice of Chickering and Gamson [AAHE Bull. 39 (1987) 3] to design a 35-item questionnaire to assess the effectiveness of an Internet-based educational statistics course. Results from the questionnaire indicated that most learners perceived that the instructor used constructivist-based principles to effectively promote student learning and that the course was a valuable learning experience. Instructional practices identified for improvement included the creation of more stimulating discussion questions and better instructor monitoring of study groups to ensure equal participation.

Basturk, R. (2005) The Effectiveness of Computer-Assisted Instruction in Teaching Introductory Statistics. *Educational Technology & Society*, **8**(2), 170-178.

The focus of this study is to demonstrate and discuss the educational advantages of Computer Assisted Instruction (CAI). A quasi-experimental design compared learning outcomes of participants in an introductory statistics course that integrated CAI to participants in a Lecture-only introductory statistics course. Reviews of participants' identical midterm and final exams scores demonstrated that participants in Lecture-plus-CAI section obtained higher averages on midterm and final exams than participants in the Lecture-only sections and these higher averages likely were because of their better performance on concepts and practices that were taught in both regular lecture and CAI

course. In addition, when the topics of the introductory statistics course moved from descriptive statistics to inferential statistics, the learning gap between Lecture-only and Lecture-plus-CAI is increased. Findings suggest participants' learning capacity of the introductory statistics could be improved successfully when CAI used as a supplement to regular lecture in teaching introductory statistics course.

Boyle, T., Bradley, C., Chalk, P., Jones, R. and Pickard P. (2003) Using blended learning to improve student success rates in learning to program, *Journal of Educational Media*, Special edition on Blended Learning, **28**(2-3), 165-178.

This article describes how two institutions combined their efforts to create a blended course for novice computer programming students. The article includes the development, implementation, and a detailed assessment of the course.

Brandon, B. (2003) Using RSS and Weblogs for e-Learning: An Overview. *Learning solutions E-magazine*.

New technologies are continually coming to the fore, and many of them have applications to e-Learning. Weblogs and RSS (an XML standard for distribution of information) are making substantial progress in 2003. This overview will give you a taste of what is being done with these by early adopters. You may find some ideas that will meet your needs to do things more simply and cheaply.

Cahyadi, V. (2004) The effect of interactive engagement teaching on student understanding of introductory physics at the faculty of engineering, University of Surabaya, Indonesia. *Higher Education Research and Development*, **23**(4), 455-464.

This study investigates the effect of a teaching method consisting of peer instruction, worksheets utilization, constructivist classroom dialogue and in-class demonstration. These teaching elements are intended to promote the interactive engagement of first year undergraduate students in an introductory physics course. The conceptual understanding of students in the experimental classes was better than that of students in the control classes which received traditional lecturing. The students in the experimental classes expressed positive responses towards the activities conducted to involve them actively in the learning process. It is also revealed that students still possess a traditional paradigm of teaching-learning. Several suggestions are presented to improve the implementation of this teaching method.

Cann, A.J. (2005) Extended matching sets questions for online numeracy assessments: a case study. *Assessment & Evaluation in Higher Education*, **30**(6), 633-640.

Extended matching sets questions (EMSQs) are a form of multiple-choice question (MCQ) consisting of a stem (the question or scenario) with an extended number of possible answers. Although there is no consensus on their absolute format, for the purpose of this paper a multiple-choice question with ten or more alternative answers is considered to be an EMSQ. Faced with the limitations imposed by virtual learning environment software, I have conducted a case study into the use of the EMSQ format in online assessment of numerical and statistical ability which shows that properly constructed questions of this type can play a valuable role in assessment of numeracy. The extended format was found to work well on screen and resulted in an increase in both student marks and student satisfaction when compared with other answer input formats. This case study indicates that the EMSQ format has much more widespread applicability for online assessment than its traditional uses.

Challis, D., Holt, D. and Rice, M. (2005) Staff perceptions of the role of technology in experiential learning: A case study from an Australian university. *Australasian Journal of Educational Technology*, **21**(1), 19-39.

This paper reports on a cross-disciplinary comparative study that examines the interplay between information and communications technologies (ICT) and experiential learning, in the context of seven fields of professional practice in undergraduate education. Our central claim is that academic teachers' framing of the meaning and nature of experiential learning shapes the actual and possible uses of ICT, in supporting the development of professional expertise in academic and workplace learning environments. Implicit in teaching conceptions and practices is an underlying view of the changing nature and conduct of the professions, and the requirements for effective entry level practice in relevant professional fields. The paper explores key indicators of ICT development and usage in

supporting the creation of meaningful professional learning, and the design of integrated, coherent, professional learning environments.

Chang, K.-E., Sung, Y.-T., Chang, R.-B. and Lin, S.-C. (2005) A New Assessment for Computer-based Concept Mapping. *Educational Technology & Society*, **8**(3), 138-148.

Concept maps are widely used in education, and have been acclaimed for their excellent results. For efficiently using concept maps in education, computer-based concept mapping systems have been developed. However these computer-based concept mapping systems are limited in their assessment algorithms. The assessment takes only concept nodes as the primary basis, with relation links playing only a minor role. To address this problem, this study proposes a new style of concept map, called the weighted concept map, which assigns a weight to each proposition in a concept map to represent its importance. This study proposes a new assessment based on a weighted concept map and diagnosis analysis. Two studies are conducted to evaluate the methods of assessment.

Dafoulas, G.A. (2005) *Enhancing Computer Mediated Communication in Virtual Learning Environments*. Fifth IEEE International Conference on Advanced Learning Technologies (ICALT'05), 404-408.

The aim of this paper is to present a study for the communication patterns evident in computer mediated communication in e-learning online communities. For the first time in this paper a list of factors affecting communication patterns within online communities is presented. A key concern of the study is twofold: first to define the correlation between patterns of communication and the affecting factors and second to suggesting criteria for designing successful learning activities. This study is concerned with an initial analysis of student interaction in three residential modules (approximately 1500 posts) that is currently followed by the analysis of threaded discussions of 32 online modules of a distance education programme.

Dickey, M.D. (2004) The impact of web-logs (blogs) on student perceptions of isolation and alienation in a web-based distance-learning environment. *Open Learning*, **19**(3), 279-291.

In the rush to promote the use of computer-mediated technologies for both traditional and distance learning, relatively little research has been conducted about learner feelings of isolation, alienation and frustration. More recent technologies such as web-logs (blogs) may provide a wider range of tools for bridging learners' feelings of isolation. The purpose of this research is to investigate the impact of using blogs in a web-based learning environment. This qualitative investigation presents an interpretive case study of student perceptions of using blogs in a web-based technology integration course for K-12 pre-service teacher education students. Findings indicate that the use of blogs helped prevent feelings of isolation and alienation for distance learners.

Divitini, M., Haugalokken, O. and Morken, E.M. (2005) *Blog to Support Learning in the Field: Lessons Learned from a Fiasco*. Fifth IEEE International Conference on Advanced Learning Technologies (ICALT'05), 219-221.

In this paper we report on our experience using a blog to support teacher education. The system has been used to support communication and reflection while students were spending a period of teaching practice. The system has not been used, despite its potential usefulness. In this paper we reflect on this experience to identify strengths and weaknesses of blogs in supporting learning in the field.

Eijl, P., Pilot, A. and Voogd, P. (2005) Effects of Collaborative and Individual Learning in a Blended Learning Environment. *Education & Information Technologies*, **10**(1-2), 51-65(15).

In courses using a virtual learning environment (VLE), some students like to work together, and some do not. If we give students the opportunity to choose either teamwork or individual study, how does this affect their marks and their appraisal and assessment of the course?

This question has been investigated in the context of an English Literature course at the University of Utrecht. In this course, students work intensively with a VLE, and attend lectures: a blended learning environment. Previous research has shown that the pedagogical design used provides a powerful learning environment. This time, students had the choice of working on the course assignments in small teams (2-4 students), or individually. Both groups were compared based on their study results, and the answers to a questionnaire. Students valued the choice. Mainly those students with high marks for a previous course, which had a similar pedagogical design, preferred collaboration. Statistical analysis showed that collaboration resulted in significantly better marks.

Forster, P.A., Dawson, V.M. and Reid, D. (2005) Measuring preparedness to teach with ICT. *Australasian Journal of Educational Technology*, **21**(1), 1-18.

In this paper we discuss the development and implementation of a questionnaire that measures preparedness to teach secondary school science with information and communication technologies (ICT). The questionnaire was designed for the purpose of evaluating the effectiveness of instruction in a science education unit in a Graduate Diploma teacher education course. Rasch analysis of the pre- and post-unit responses indicated domains of expertise for which students perceived they had improved their knowledge during the unit, and domains for which they perceived they were less knowledgeable after the unit than before it. We discuss students' responses in relation to the unit, and report the technical decisions that we made as part of the analysis. The questionnaire could be adapted easily to suit preservice teacher education in disciplines other than science.

Fox, R. and Rowntree, K. (2004) Linking the Doing to the Thinking: using criterion-based assessment in role-playing simulations. *Planet*, **13**, 12-15.

This paper uses a case study to show how we developed a criterionbased assessment instrument in the context of a postgraduate level module in a South African University. The module's pedagogy is based on three inter-linked active learning strategies. The 'African Catchment Game' is a role-playing simulation game and is the focus of this article. The other activities were a portfolio and a computer simulation. The assessment was designed to promote conceptual understanding after each activity and so can be positioned within Kolb's experiential learning cycle. Evaluations from the learners in 2003 showed that the module had been successful in developing their ability to relate experiences from simulations to the theoretical literature.

Gamliel, E. and Davidovitz, L. (2005) Online versus traditional teaching evaluation: mode can matter. *Assessment & Evaluation in Higher Education*, **30**(6), 581-592.

Using an experimental mixed design, this study compared the traditional paper-and-pencil method for evaluating teaching with the online method. Replicating previous findings, the comparison revealed similar evaluation means of the two methods. However, the stability of teaching evaluations using paper-and-pencil twice was substantially higher than the corresponding stability using different methods—online and paper-and-pencil. One possible explanation for this finding is the different visual presentation of the scales: a typical form of the paper-and-pencil method presents the scale horizontally, enabling the subjects to examine the profile of their answers that might result in an artificially lower variability of the evaluations. In contrast, an electronic answering form can abolish this artificial answering effect.

Garrison, D.R. and Kanuka, H. (2004) Blended learning: Uncovering its transformative potential in higher education. *Internet and Higher Education*, **7**(2), 95-105.

The purpose of this paper is to provide a discussion of the transformative potential of blended learning in the context of the challenges facing higher education. Based upon a description of blended learning, its potential to support deep and meaningful learning is discussed. From here, a shift to the need to rethink and restructure the learning experience occurs and its transformative potential is analyzed. Finally, administrative and leadership issues are addressed and the outline of an action plan to implement blended learning approaches is presented. The conclusion is that blended learning is consistent with the values of traditional higher education institutions and has the proven potential to enhance both the effectiveness and efficiency of meaningful learning experiences.

Gilbert, J. and Kelly, R. (2005) Frontiers and frontlines: metaphors describing lecturers' attitudes to ICT adoption. *Educational Technology & Society*, **8**(3), 110-121.

This paper explores the assimilation gap, the gap between the acquisition of a technology and its deployment, in higher education teaching. The relevant literature covers three themes: technology diffusion, the technology acceptance model and task-technology fit. To explore the significance of these models to a teaching environment case study research was undertaken within a university college in north-west England. Using an ethnographic approach, with semi-structured interviews, lecturers' attitudes to the adoption of ICT were surfaced. Then the data collected was analysed by categorising the findings. One technique used to present these findings is the translation of the dialogue of each respondent into another character. This defamiliarised the taken for granted aspects of the informants' response. Using this method respondents were categorised using two metaphors suggesting that staff can be classified within two different cultures. The first metaphor is that of the Frontier where the adoption of ICT is seen as an exploration and the discourse used relates to the relative desire for adoption of ICT. The second metaphor

is that of the Frontline where the view of ICT adoption centres on attack and defence and the discourse relates to the differences in the perceived ease of adoption.

Glogoff, S. (2004) Blogging In An Online Course: A Report on Student Satisfaction Among First-time Bloggers. <http://ltc.arizona.edu/edit/blogginginonlineworldpdf.pdf>

Decision Making for Information Professionals was a ten-week, online masterslevel course taught during summer 2003 to twenty-nine students geographically dispersed across North America. Weblogs were introduced as an additional communication tool to the course's threaded discussion forums and chat room. Assessment data was collected at the course's conclusion examining the students' experiences, attitudes, and overall satisfaction with the weblogs. This presentation will report on that assessment data, provide the instructor's observations on the students' use of the course weblogs, explanations for possible barriers to their acceptance, and recommendations for successful implementation. Conclusions drawn from this information should be helpful in determining if using weblogs as a communication tool in a given online course has potential.

Goodyear, P. (2005) Educational design and networked learning: Patterns, pattern languages and design practice. *Australasian Journal of Educational Technology*, **21**(1), 82-101.

There is a growing demand for advice about effective, time efficient ways of using ICT to support student learning in higher education. This paper uses one such area of activity - networked learning - as a context in which to outline a novel approach to educational design. The paper makes two main contributions. It provides a high level view of the educational design problem space. It then introduces the patterns based approach to educational design. While other professional communities, particularly in software engineering, have been developing patterns based approaches to sharing and re-using design experience, this paper goes back to the original conceptions of participatory design that informed Christopher Alexander's early work on patterns and pattern languages. In particular, it makes connections between the technicalities of design and the central place of values. A patterns based approach can help with encoding, sharing and using knowledge for educational design. But it is also a powerful way of connecting educational values and vision to the details of the tasks, tools and resources we offer our students.

Hamilton, A.J. (2005) SLAC: A tool for addressing chaos in the ecology classroom. *International Journal of Mathematical Education in Science and Technology*. **36**(5), 489 - 496

Until the early 1970s, ecologists generally assumed that erratic fluctuations observed in natural populations were a product of stochastic noise. It is now known that extremely complex dynamics can arise from basic deterministic processes. This field of study is generally called chaos theory. Here, a computer program, SLAC (Stability, Limits, And Chaos), is described, which facilitates the study of a simple deterministic model known as the logistic difference equation. It is designed to familiarize the biology student, who may not be mathematically inclined, with the fundamental concepts of population dynamics, especially the not-so-intuitive notion that complexity can evolve from deterministic mechanics. In addition to the program, pedagogically significant issues associated with the derivation of the equation and its parameters, and population dynamics in general, are highlighted.

Hewlitt, M. J. (2000) *Teaching Molecular Biology on the Web*. Proceedings of the NAWeb, The Web-based Learning Conference. <http://naweb.unb.ca/proceedings/2000/mjhNAWeb.html>.

A large, upper division course in molecular biology was taught online for the first time in the spring semester of 2000. About 150 students enrolled in this course, which included Web interactive modules, online chat rooms, Listserv communication and other features common to many distance learning protocols. The student performance in the course was subjectively judged to be improved over the traditional lecture approach. In addition, student attitude toward the course, measured objectively, became more positive from the beginning to the end of the semester. Instructor pedagogical goals were easier to achieve, although it appears subjectively to be more challenging to teach in the absence of live student/faculty interaction.

Holbrook, N.J. and Devonshire, E. (2005) Simulating scientific thinking online: an example of research-led teaching. *Higher Education Research and Development*, **24**(3), 201-213.

In the contemporary higher education system there is growing interest in, and debate about, the need to strengthen and sustain the relationships between teaching and research. While there are multiple and varied explanations about

these relationships, most acknowledge the importance of designing learning activities that explicitly develop the research-teaching nexus: a methodology known as research-led teaching. The paper illustrates the integration of a research-led teaching approach in an online context, using an ocean (climate) model simulation activity in two undergraduate units as a case study. The modelling activity draws on disciplinary research as the underpinning content and stimulus for learning, and incorporates tasks designed to simulate scientific thinking as well as facilitate understanding of abstract concepts about the ocean (and atmosphere) climate system. It also demonstrates a research-led teaching activity that has been successfully applied in different disciplinary contexts, physical geography (atmospheric science sub-discipline) and physics.

Jeffries, P., Grodzinsky, F. and Griffin, J. (2003) Advantages and Problems in Using Information Communication Technologies to Support the Teaching of a Multi-institutional Computer Ethics Course, *Journal of Educational Media*, **28**(2-3), 191-202.

The 'political push' and technological 'pull' currently prevalent in many higher education institutions is encouraging educationalists to increasingly experiment with tools that promote collaborative work, which, in turn, is perceived to help in the development of more autonomous, responsible learners. This study will focus on the advantages and problems of using Information Communication Technologies to support a blended learning approach to the teaching of a multi-institutional Professional Issues/Computer Ethics course. First, it will examine how the collaboration was facilitated by the use of a commercially available collaborative learning management tool, Blackboard. It will detail how Blackboard was used in two fieldwork studies (years one and two of this collaboration) to enhance the teaching of professional issues in computing/computer ethics at the University of Limerick in Ireland, at De Montfort University in England and at Sacred Heart University in the United States of America. Next, it will examine how, in the second year, the Belbin (1981) Self-Perception Inventory was used to help in the establishment of virtual teams by getting students to consider individual differences in determining group roles. Finally, the results in terms of outcomes and student/staff reactions will be given.

Jerry, P., Demish, H. and Collins, S. (2003) *Mediating affect and attitude while learning in a web-based format: The Campus Alberta Applied Psychology experience*. Proceedings of the NAWeb, The Web-based Learning Conference. <http://naweb.unb.ca/proceedings/2003/PaperJerry.html>.

The Campus Alberta Applied Psychology: Counselling Initiative delivers a Master's degree in counseling psychology using a primarily Web-based / summer school format. Students and faculty in this program are engaged in teaching and learning counselling psychology, a discipline that explores the interaction between two people or groups in a helping context. This paper explores the issues that have emerged as counselling psychology students and faculty expand their learning and teaching experiences in a technologically-rich web-based learning environment. Specific strategies include the deliberate use of counselling skills and the working alliance construct in maintaining virtual community, relationship-based approaches to computer-mediated communication forums participation, and instructor training for web-based teaching.

Johnson, G.M. (2005) Student Alienation, Academic Achievement, and *WebCT* Use. *Educational Technology and Society*. **8**(2), 179-189.

The current investigation sought to understand the relationships between college student alienation, academic achievement, and use of *WebCT*. Fifty-three students enrolled in an undergraduate educational psychology course provided three types of data: 1) self-rating of eight Likert scale alienation items, 2) academic achievement measured with four types of multiple choice questions evaluating mastery of course content, and 3) use of *WebCT* defined as total number of Hits, Articles Posted, and Articles Read. Findings suggest that peer alienation was associated with increased *WebCT* use; learning alienation and course alienation were associated with low *WebCT* use. Learning alienation demonstrated an inverse relation to academic achievement. In most cases, significant predictive relationships between academic achievement and student use of *WebCT* were curvilinear.

Karagiorgi, Y. and Symeou, L. (2005). Translating Constructivism into Instructional Design: Potential and Limitations. *Educational Technology & Society*, **8**(1), 17-27.

Instructional designers are expected to be familiar with the epistemological underpinnings of several theories and their consequences on the process of instruction. Constructivism is the dominant theory of the last decade and supports construction of knowledge by the individual. This paper discusses the basic principles underlying constructivism, particularly active, collaborative and authentic learning. Application of these principles on the process – analysis, development, evaluation – of instructional design poses certain challenges with regards to issues

such as pre-specification of knowledge, authentic evaluation and learner control. Most of the problems are attributed to the fact that constructivism is a learning theory and not an instructional-design theory. Therefore, instructional designers must attempt to translate constructivism into instructional design through a more pragmatic approach that focuses on the principles of moderate – rather than extreme – constructivism and makes use of emergent technology tools. This shift could facilitate the development of more situated, experiential, meaningful and cost-effective learning environments.

Kerres, M. and De Witt, C. (2003) A Didactical Framework for the Design of Blended Learning Arrangements. *Journal of Educational Media*, **28**(2-3), 101-113.

Blended learning arrangements combine technology based learning with face-to-face learning and have become quite popular in different contexts. However, models for their didactical design that are based on theoretical concepts are still missing. The article presents a general framework that describes didactical design decisions regarding the elements of a blended learning arrangement (content, communication, construction) and the choice of the delivery system. Special emphasis is placed on the cost that is associated with different communication scenarios for the learner and must influence design decisions.

Kinzie, M.B., Whitaker, S.D. and Hofer, M.J. (2005) Instructional Uses of Instant Messaging (IM) During Classroom Lectures. *Educational Technology and Society*. **8**(2), 150-160.

Can “Information Age” learners effectively multi-task in the classroom? Can synchronous classroom activities be designed around conceptually related tasks, to encourage deeper processing and greater learning of classroom content? This research was undertaken to begin to address these questions. In this study, we explored the use of instructionally-related instant messaging (IM) discussions during undergraduate university lectures. Over the course of three weeks, students practiced with and then employed hand-held computers for brief, synchronous class discussions in response to assigned questions related to the lectures. Students were observed during these sessions, and students and the instructors were interviewed separately afterwards. The contents of students’ discussions indicate that they were capable of engaging in on-task discussions and of expressing opinions and exploring instructionally relevant topics. However, even though students routinely multi-task in classrooms as they attend to lectures, process the contents, and record notes for later study, both students and the instructors expressed some discomfort with discussion occurring synchronously with classroom lectures. In this paper, we describe student discussion behavior, and reflect on possible applications of multiple sequential (rather than simultaneous) tasks during classroom instruction.

Knight, D.G. (2005) Digital maps, matrices and computer algebra. *International Journal of Mathematical Education in Science and Technology*, **36**(4), 345 – 359.

The way in which computer algebra systems, such as Maple®, have made the study of complex problems accessible to undergraduate mathematicians with modest computational skills is illustrated by some large matrix calculations, which arise from representing the Earth's surface by digital elevation models. Such problems are often considered to lie in the field of computer mapping and thus addressed by geographical information systems. The problems include simple identification of local maximum points, visualization by cross-sectional profiles, contour maps and three-dimensional views, consideration of the visual impact of the placement of large buildings and issues arising from reservoir creation. Motion through a virtual landscape can be simulated by an animation facility. This approach has been successful with first year students: the ‘real world’ problems considered are more accessible than many alternatives, and the attraction of using large matrices is retained.

Kravcik, M., Kaibel, A., Specht, M. and Terrenghi, L. (2004) Mobile Collector for Field Trips. *Educational Technology and Society*. **7**(2), 25-33.

Current e-Learning is based on learning management systems that provide certain standard services – course authoring and delivery, tutoring, administration and collaboration facilities. Rapid development of mobile technologies opens a new area of m-Learning to enhance the current educational opportunities. Field trips are a relevant part of the curriculum, but for various reasons it is often difficult to organize them. The aim of the RAFT project is development of a system that would enable virtual field trips. One mobile learning application prototype created in this project, called Mobile Collector, enables data gathering and annotation in the field, together with real time collaboration. The application supports learner-centred education in real world context.

Kunz, P., Dewstow, R. and Moodie, P. (2003) *A Generic Tool to setup metacognitive Journals and their Serendipitous Use*. In G. Crisp, D. Thiele, I. Scholten, S. Barker and J. Baron (Eds), *Interact, Integrate and Impact, Proceedings of the 20th Annual Conference of the Australian Society for Computers in Learning in Tertiary Education*. Adelaide, 7-10 December 2003. <http://www.ascilite.org.au/conferences/adelaide03/docs/pdf/283.pdf>.

Reflective journals for individual learners are a powerful pedagogical approach to foster metacognition. However, the set up of individual journals in an online learning environment can be a very time consuming task. This contribution will take the creation of reflective online journals as an example to highlight the need for generic educational tools. The creation of such a generic tool to generate reflective online journals will be discussed. Preliminary evaluation of the use of this tool has shown an unexpected and surprisingly creative use of how teachers have applied it to their online learning environments.

Maag, M. (2005) The Potential Use of “Blogs” in Nursing Education. *Computers, Informatics, Nursing*. **23**(1),16-24, January/February.

Web logs, also known as “blogs,” are an emerging writing tool that are easy to use, are Internet-based, and can enhance health professionals’ writing, communication, collaboration, reading, and information-gathering skills. Students from different disciplines, such as medicine, public health, business, library science, and journalism, garner knowledge from blogs as innovative educational tools. Healthcare professionals are expected to be competent in the use of information technology to be able to effectively communicate, manage information, diminish medical error, and support decision making. However, the use of blogs, as an interactive and effective educational method, has not been well documented by nurse educators.

Matusov, E., Hayes, R. and Pluta, M. J. (2005). Using discussion webs to Develop an Academic Community of Learners. *Educational Technology & Society*, **8**(2), 16-39.

The World Wide Web has made possible an entirely new form of communication in the classroom: asynchronous, public, non-sequential, and selective (Windschitl, 1998). However, it is unclear how discussion webs can contribute to educational processes. Our research investigates the role of instructional interactive webs in promoting among preservice teachers an “academic community of learners,” defined as an academic community that grounds inquiries and dilemmas emerging in their practice in an academic discourse based on considering alternatives and providing argumentation and evidence for their claims (Wells, Chang, & Maher, 1990). Based on this definition of a community of learners and concerns raised by fellow instructors, we created categories and analyzed one class discussion web, coding a total of 1,124 web entries of undergraduate students and their instructor to examine references they used, topics, genres, and relationships with other messages. Our findings suggest that students’ web postings were mostly very sophisticated in that students were able to integrate outside references with new and enriching discussion topics, thereby providing viewpoints alternative to and sometimes critical of those expressed by the instructor and other students. These findings suggest that instructional interactive webs can be a useful tool for promoting and building an academic community of learners.

Mitchell, T.J.F., Chen, S.Y. and Macredie, R.D. (2005) The relationship between web enjoyment and student perceptions and learning using a web-based tutorial, *Learning, Media & Technology*, **30**(1), 27-40.

Web enjoyment has been regarded as a component of system experience. However, there has been little targeted research considering the role of web enjoyment alone in student learning using web-based systems. To address this gap, this study aims to examine the influence of web enjoyment on learning performance and perceptions by controlling system experience as a variable in the study. 74 students participated in the study, using a web-based tutorial covering subject matter in the area of ‘Computation and algorithms’. Their learning performance was assessed with a pre-test and a post-test and their learning perceptions were evaluated with a questionnaire. The results indicated that there are positive relationships between the levels of web enjoyment and perceived usefulness and non-linear navigation for users with similar, significant levels of system experience. The implications of these findings in relation to web-based learning are explored and ways in which the needs of students who report different levels of web enjoyment might be met are discussed.

Montelpare, W.J. and McPherson, M.N. (2001) *Integrating web-based curriculum as an on-line resource for an undergraduate introductory statistics course -- TAKE 2!* Proceedings of the NAWeb, The Web-based Learning Conference. <http://naweb.unb.ca/proceedings/2001/P8Montelpare.htm>.

In the 1999-2000 academic calendar year, we presented an Introduction to Statistics course – “nearly completely online”. The “completely” portion referred to the fact that all of the lectures, assignments, and exams, were presented online”. The “nearly” part referred to the presentation of weekly tutorials for individuals that were struggling with the online material, and especially individuals that had difficulty completing assignments. The consequences of our first attempt at online delivery were a higher than usual class average, a cohort of students that experienced web-based delivery – whether they wanted to or not, and a great deal of learning by the two course developers.

Introductory Statistics is difficult enough. Expecting students to understand concepts without experiencing the benefits derived from fellow students asking questions or discussing logic, as would occur in the traditional classroom, may be expecting too much. Following many discussions with colleagues and students, we revisited the presentation strategy. Our second attempt at online delivery recognized the utility of web-enhancement while being careful to avoid “making the media the message”. Through the selected approach, the course explicitly reduced the role of the electronic curriculum in the delivery, while enhancing the importance of traditional lecturing. The compromise was to leave the course notes (including many scenarios and examples) online, but continue to present the course through weekly formal lectures. The result was a learning environment in which students were required to “go online” to complete assignments, review course notes, or communicate with instructors and teaching assistants. The lecture hall became an environment of thematic conversational discourse rather than strict didactic presentation.

This paper describes the dynamics associated with including a web-based approach to the delivery of introductory undergraduate statistics. Specifically, the paper illustrates the results of applying “lessons learned” from our previous experiences.

Motschnig-Pitrik, R. and Mallich, K. (2004) Effects of Person-Centered Attitudes on Professional and Social Competence in a Blended Learning Paradigm. *Educational Technology & Society*, 7(4), 176-192.

Web-based technology increases the hours we spend sitting in front of the screens of our computers. But can it also be used in a way to improve our social skills? The blended learning paradigm of Person-Centered e-Learning (PCeL) precisely aims to achieve intellectual as well as social and personal development by combining the benefits of online learning with face-to-face encounters. While the added value of Person-Centered or whole-person learning in terms of better problem solving, increased self-confidence and interpersonal skills is well documented in the literature, its transition into practice clearly lags behind. Our goal therefore is to exploit the potentials of Web-based support for making Person-Centered teaching and learning more effective and feasible. In the paper we discuss the didactical baseline, the integration of technology, and the application of PCeL in the context of Web engineering and project management. On that basis we present our evaluation that showed – with surprising clarity – the fundamental impact of interpersonal attitudes on the motivation and learning outcome of students. Finally, we discuss the consequences of our findings for future educational strategies.

Nückles, M., Schwonke, R., Berthold, K. and Renkl, A. (2004) The use of public learning diaries in blended learning, *Journal of Educational Media*, 28(1), 49-66.

Learning diaries—as we employ them—are students’ written reflections of their learning experiences and outcomes over the course of university seminars. The writing of such diaries is ‘tutored’ by a computer program: eHELP supports the writing of sophisticated learning diaries through a modelling and scaffolding of the phases of planning, production and revision. In addition, the learning diaries get published—by uploading them in a cooperation platform—so that the learners can read and discuss their peers’ diaries. The main function of such public learning diaries is to enrich traditional university courses (Blended Learning) with additional elaborative, organisational, critical reasoning, and metacognitive activities in order to foster a deeper processing and better retention of the contents to be learnt. We would like to present the educational rationale of our approach and report the findings of corresponding empirical studies.

Oravec, J.A. (2003) Blending by Blogging: weblogs in blended learning initiatives, *Journal of Educational Media*, **28**(2-3), 225-233.

Weblogs ('blogs') are emerging in many educational contexts as vehicles for personal expression and the dissemination and critique of Internet materials. The study of the weblog phenomenon in itself can convey important insights about social construction; hundreds of thousands of blogs emerged worldwide within a fairly short time span without considerable direction from corporations or other institutions. Strategic approaches toward blended learning environments are often instructor-centered, with control of the mix of educational approaches in the instructor's hands. In contrast, weblogs are a flexible medium that can be used in approaches that provide educational participants with a 'middle space' of options as to how to integrate face-to-face and online modes. Weblog construction encourages the development of individual, critical voices within the broader context of classroom interactions.

Orsmond, P., Merry, S. and Reiling, K. (2005) Biology students' utilization of tutors' formative feedback: a qualitative interview study, *Assessment & Evaluation in Higher Education*, **30**(4), 369-386.

Ramaprasad (1983) defined feedback as information about the gap between actual performance level and the reference level, which is subsequently used to alter that gap. Feedback, therefore, needs to be meaningful, understood and correctly acted upon. Tutors not only have to give feedback; they should really evaluate how effective their feedback has been. This study reports the findings of semi-structured interviews with third year biology students on their utilization of tutor feedback. We show that students use feedback in six ways. Four specific uses were (a) to enhance motivation; (b) to enhance learning; (c) to encourage reflection; and (d) to clarify understanding. Two further forms of usage were, firstly, to enrich their learning environment and, secondly, to engage in mechanistic enquiries into their study. The findings are discussed in the context of current literature and specific recommendations are given as to how the impact of tutors' feedback could be enhanced.

Payne, T. (2003) *An Evaluation of Wiki-based Collaboration in an Undergraduate Computer Science Classroom*. <http://mywebpages.comcast.net/tpayne03/images/technicalreport.pdf>.

The rapid expansion of the Internet in the past decade has provided a multitude of new methods for collaboration between learners worldwide. One tool that serves to manage this increased online discussion and interaction is the Wiki. A Wiki is basically a collection of web pages with dynamic structure and content that can be modified by any user. Wikis have been employed repeatedly in classroom settings with the goal of facilitating web-based collaboration. However, the results of these efforts have been largely undocumented to date. The purpose of this project was to evaluate the efficacy of Wiki-based collaboration in an undergraduate Computer Science class. This evaluation was performed through the administration of a survey to the students in the fall, 2002 section of CS333-Computer Architecture. This class, which was taught by Professor Chris Milner, employed a Wiki to facilitate online collaboration between students. The results of this survey were used to determine the strengths and weaknesses of Wiki-based collaboration as experienced by the students throughout the semester. The evaluation also produced a list of possible modifications to the Wiki that the students saw as potentially valuable for future endeavors. Five of these enhancements were selected for implementation, and were added to an existing Wiki implementation named ASP Wiki. The successful development of these features resulted in the creation of a Wiki clone designed specifically for use in future undergraduate Computer Science classes.

Peat, M., Franklin, S., Devlin, M. and Charles, M. (2005) Revisiting the impact of formative assessment opportunities on student learning, *Australasian Journal of Educational Technology*, **21**(1), 102-117.

This project developed as a result of some inconclusive data from an investigation of whether a relationship existed between the use of formative assessment opportunities and performance, as measured by final grade. We were expecting to show our colleagues and students that use of formative assessment resources had the potential to improve performance of first year students. This first study, undertaken in semester 1 2002, indicated that there was no apparent relationship between the two, even though the students reported how useful they found the formative assessment resources. This led us to ask if there was a transition effect such that students were not yet working in an independent way and making full use of the resources, and/or whether in order to see an effect we needed to persuade non-users of the resources to become users, before investigating if use can be correlated with improvement in performance. With the 2002-3 NextEd ASCILITE Research Grant we set out to repeat our project and to look at

use and usefulness of resources in both first and second semester, to encourage non-users to become users and to investigate the relationship between use and performance. Now our story has a different ending.

Prins, F.A., Sluijsmans, D.M.A., Kirschner, P.A. and Strijbos, J.-W. (2005) Formative peer assessment in a CSCL environment: a case study. *Assessment & Evaluation in Higher Education*, **30**(4), 417-444.

In this case study our aim was to gain more insight in the possibilities of qualitative formative peer assessment in a computer supported collaborative learning (CSCL) environment. An approach was chosen in which peer assessment was operationalized in assessment assignments and assessment tools that were embedded in the course material. The course concerned a higher education case-based virtual seminar, in which students were asked to conduct research and write a report in small multidisciplinary teams. The assessment assignments contained the discussion of assessment criteria, the assessment of a group report of a fellow group and writing an assessment report. A list of feedback rules was one of the assessment tools. A qualitative oriented study was conducted, focusing on the attitude of students towards peer assessment and practical use of peer assessment assignments and tools. Results showed that students' attitude towards peer assessment was positive and that assessment assignments had added value. However, not all students fulfilled all assessment assignments. Recommendations for implementation of peer assessment in CSCL environments as well as suggestions for future research are discussed.

Rentoul, R.M.S, Hine, N.A., Specht. M., Kravcik, M., Fraunhofer-Gesellschaft (2003) *Beyond Virtual Field Trips: Collaboration and m-Learning*. Proceedings of the NAWeb, The Web-based Learning Conference. <http://naweb.unb.ca/proceedings/2003/PaperRentouletal.html>.

Developments in technology have reached a level of capability that enables more sophisticated and thought induced applications to be contemplated than were previously possible. E-Learning and m-Learning are maturing and the users of the technology are more familiar with the concepts involved.

The RAFT (Remote Accessible Field Trips) philosophy is, therefore, to employ such systems to produce an integrated, interactive system to link, in real-time, field trips and classrooms. It is being designed to make appropriate use of technology to improve and enhance the educational experience of students. The primary driver for this development is the fact that it is becoming increasingly difficult in many countries to organise field trips for reasons including finance, staffing levels and health and safety issues.

The RAFT approach offers a viable solution as only a few students will go to the field but the remaining students interact in real-time with the students in the field. Web based interaction tools, including video conferencing and wireless wide area networking are used to achieve this. The design of the technology reflects best practice in collaborative and cooperative learning principles.

It is intended that the field trips will be firmly embedded in the curriculum as they are being developed with the cooperation of practising teachers in a wide range of subjects. During the field trip, many learning objects will be produced and these will be managed by an Adaptive Learning Environment for later reuse in assignments and in future study. There is also scope to extend the reach of the school by having remote classrooms and remote experts contributing to and participating in the field trip. This paper describes the approaches used and the progress made to date in the project.

Ricketts, C. and Zakrzewski, S. (2005) A risk-analysis approach to implementing web-based assessment. *Assessment & Evaluation in Higher Education*, **30**(6), 603-620.

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.

Schweizer, K., Paechter, M. and Weidenmann, B. (2003) Blended Learning as a Strategy to Improve Collaborative Task Performance, *Journal of Educational Media*, **28**(2-3), 211-224.

An empirical study was used to analyse how groups of learners work together in e-learning and blended learning environments. We compared three pure e-learning courses with one course whose e-learning phases alternated with face-to-face phases (blended learning). The participants of these courses formed learning teams consisting of four members who met at three points in time. They were instructed in certain topics in Psychology via five virtual rooms (pages) on the Internet (virtual classroom, electronic bulletin board, etc.). All learners received two types of learning

material: joint material, to build shared knowledge, and additional information that was different for each group member (unshared knowledge). After a period of 2 weeks of individual e-learning the learning teams met as an asynchronous newsgroup, as a synchronous chat group, as a synchronous videoconference group, or as a face-to-face group (blended learning condition). In these learning teams students were requested to solve four different types of tasks together. The tasks differed with regard to whether they were already known from the individual learning phase and with regard to whether they referred to shared or unshared knowledge.

Among other variables we analysed were the students' extent of online activity (e.g. number of logins), the groups' task performance, and the coherence of the group discourse. The performance in the e-learning conditions was compared with the performance in the blended learning condition.

The empirical results show that achievement in a group of learners does not depend solely on the communication setting. An interaction between the communication setting and the type of task could be observed. If the group members had to share and exchange their knowledge to come to a joint solution they achieved better results in synchronous settings, especially in the videoconference and the face-to-face setting. These findings are supported by the results of a content analysis of the communication undertaken. Learners in the blended learning condition who worked together face-to-face led a much more coherent discourse than learners in the pure e-learning conditions.

Segrave, S., Holt, D. and Farmer, J. (2005) The 6 by the power 3 model for enhancing academic teachers' capacities for effective online teaching and learning: Benefits, initiatives and future directions. *Australasian Journal of Educational Technology*, **21**(1), 118-135.

To gain the full educational benefits of the major new investments in corporate technologies supporting online teaching and learning it is argued that a strategic, systems based approach to academic professional development (APD) is required. Such an approach requires a clear view of the key areas of potential and enduring teaching and learning benefit which can be realised from online developments, including an understanding of the changing role of the academic teacher in higher education, the identification of the desired professional capacities to educate online, and the implementation of a number of coordinated initiatives to develop these professional capacities in order to engage constructively with the learning and technology opportunities. Based on previous work, we propose a 6^{thre} model of Academic Professional Capacities Development for effective APD of online teaching and learning. The model can help inform the actions of policy makers, executives and practitioners in ways that promote an authentic learning organisation.

Sharma, M.D., Khachan, J., Chan, B and O'Byrne, J. (2005) An investigation of the effectiveness of electronic classroom communication systems in large lecture classes. *Australasian Journal of Educational Technology*, **21**(2), 137-154.

Since 2002 we have been investigating the use of an electronic classroom communication system in large first year lecture classes. Handheld keypads were distributed to teams of students during a lecture class. Students used the keypads to answer two step multiple choice problems after a discussion within their group. The questions were generated using students' answers from previous exams. We have evaluated our use of the classroom communication system using a survey about how comfortable students are with this type of interaction. In addition, we have tried to determine if the use of the classroom communication system can be linked to student performance on exams. Our results show that students are comfortable with this technology and feel that, on the whole, interactive lectures are useful. At a first glance, there is an improvement in students' exam performance, but there are too many competing factors to clearly say that this improvement is solely due to the use of the classroom communication system. Even though this paper is based in physics and a physics example is used to illustrate points, the technique can be applied to other discipline areas

Sheard, J and Markham, S. (2005) Web-based learning environments: developing a framework for evaluation. *Assessment & Evaluation in Higher Education*, **(30)**4, 353-368.

With the widespread use of web-based learning environments in the tertiary sector it is important to establish the usability of such environments for the target audience and their effectiveness in terms of meeting the educational objectives. However, a search of the literature has shown a scarcity of systematic evaluative studies of web-based learning environments. Furthermore, the literature did not reveal a consistent starting position on appropriate methodologies with which to carry out such evaluations. This paper presents a general methodology for evaluating complex systems that is particularly appropriate for web-based learning systems. Using what is called a trailing methodology (Finne et al., 1995), an evaluation was carried out of a web site that was used with student industrial experience projects. A key element in this evaluation was that the process was adaptive and collaborative; another

was that it involved a team with expertise in evaluation, knowledge of the functional aspects of the web site and the educational purpose of the site. The evaluation process

Suanpang, P., Petocz, P. and Reid, A. (2004) Relationship between learning outcomes and online accesses. *Australasian Journal of Educational Technology*, **20**(3), 371-387.

This paper reports on a study carried out in Thailand investigating the relationship between students' use of an e-learning system and their learning outcomes in a course on Business Statistics. The results show a clear relationship between accesses to the e-learning system, as measured by number of "hits", and outcomes, as measured by final results. While the results do not establish a direct casual connection, they indicate that under appropriate conditions a component of online study provides significant benefits to learning. In this, it contrasts with the results of recent studies that find no relationship between access and results. Quotes taken from interviews with some of the students illuminate the relationship between the online learning environment and their own learning

Tosh, D. and Werdmuller, B. (2004) *Creation of a learning landscape: weblogging and social networking in the context of e-portfolios*. http://www.eradc.org/papers/Learning_landscape.pdf.

The e-portfolio is for many a recognised tool employed for a multitude of purposes: employment; assessment; life-long learning; professional development; accreditation of prior learning. The number of institutions adopting some type of e-portfolio system has risen dramatically over the past two years. The e-portfolio is altering learning pedagogy and for some creating a truly learner-centric knowledge environment. Countless institutions are pushing ahead setting up systems to act as e-portfolios, others have grand visions; every citizen in the EU will have an e-portfolio by 2010.

Still questions remain: how can we promote student engagement in the process? In the pursuit of assessment data adopted by a positivist model are we missing an opportunity to support deep learning? This short report will explore one idea which could help address the problem of learner engagement creating a scenario where students *want* to use the system therefore be at the centre of the whole e-portfolio process and in turn, through engagement, benefit from the deep learning potential.

Tosh, D. and Werdmuller, B. (2004) *ePortfolios and weblogs: one vision for ePortfolio development*. http://www.eradc.org/papers/ePortfolio_Weblog.pdf

Use of the Electronic Portfolio (ePortfolio) is rising around the world and in particular the US and UK. Two main purposes of the ePortfolio include: promotion of student-centred learning and reflection; career planning and CV building. Weblog use has grown rapidly leading to the development of some excellent programs for keeping a daily online 'diary'. This report explores the possibility of merging weblog technology with ePortfolios, creating a platform for learning reflection.

Trinidad, S., Aldridge, J. and Fraser, B. (2005) Development, validation and use of the Online Learning Environment Survey. *Australasian Journal of Educational Technology*, **21**(1), 60-81.

This article reports the development, validation and use of a survey for assessing students' perceptions of their e-learning environments. The Online Learning Environment Survey (OLES) was administered to 325 students, 131 in Australia and 194 in Hong Kong. The data were analysed to examine 1) the reliability and validity of the survey, 2) differences between the perceptions of a) students' actual and preferred environment, b) students and their teacher and c) male and female students and 3) whether associations exist between students' perceptions of their e-learning environment and their enjoyment of e-learning. In addition to quantitative data, unstructured interviews were used to provide a more in depth understanding of the e-learning environments created. These data provide valuable feedback to educators working in e-learning environments to help teachers to evaluate the effectiveness of the environment and to make adjustments and improvements as required.

Utts, J., Sommer, B., Acredolo, C., Maher, M.W. and Matthews, H.R. (2003) A Study Comparing Traditional and Hybrid Internet-Based Instruction in Introductory Statistics Classes, *Journal of Statistics Education*, **11**(3).

Advances in technology coupled with increasing student enrollment numbers have led some universities to begin offering on-line classes. This paper discusses a study comparing a traditional offering of elementary statistics with a "hybrid" offering. In the hybrid offering the class met once a week, but students were required to learn the material on their own using web-based materials and a textbook. We examined differences in student performance, student

satisfaction and investment of both student and instructor time. Performance of students in the hybrid offering equaled that of the traditional students, but students in the hybrid were slightly less positive in their subjective evaluation of the course.

Weller, M., Pegler, C. and Mason, R. (2005) Use of innovative technologies on an e-learning course *Internet and Higher Education* **8**, 61–71

This paper examines how four innovative Internet technologies were incorporated into one course at The UK Open University. The technologies were: blogging, audio conferencing, instant messaging and Harvard's Rotisserie system. Each of the technologies is addressed, and details from the student evaluation are provided. The student feedback on all the technologies was positive. The role of the learning object based course design is examined and it is suggested that this approach facilitates the incorporation of innovative technologies into a course. The authors suggest that as students become increasingly accustomed to standard communication tools such as asynchronous bulletin boards, there will be a shift towards implementing a range of technologies, each offering particular affordances for different forms of communication.

Woods, R. Baker, J.D. and Hopper, D. (2004) Hybrid structures: Faculty use and perception of web-based courseware as a supplement to face-to-face instruction. *Internet and Higher Education*, **7**, 281–297.

The researchers examined responses from 862 faculty members at 38 institutions nationwide using the blackboard Learning Management System (LMS) to supplement their face-to-face instruction. The four research questions addressed the primary uses that faculty make of blackboard, perceptions that faculty have of how certain blackboard features enhance or elevate (or might enhance or elevate) their assessment of student work and instructional capabilities, and how faculty use of blackboard might positively affect the psychosocial climate within the face-to-face classroom setting. Additional analysis sought to identify the factors that predict use and positive perception of blackboard as a supplement to face-to-face teaching activities. The results indicate that faculty primarily used blackboard as a course management/administration tool to make course documents available to students and manage course grades. Few faculty used blackboard for instructional or assessment purposes, and even fewer utilized blackboard to foster a more positive sense of community within their face-to-face classes. Faculty attitudes, on the whole, were positive when it came to the classroom management functions of blackboard, but neutral or otherwise undecided in terms of its instructional or psychosocial benefits. The main factor in determining blackboard usage—whether for course administration or instructional purposes—was experience with the tool. In addition, women had more positive attitudes than men did in terms of blackboard's potential to enhance classroom management and foster a positive relational climate. Limitations of the study and suggestions for future research are discussed before concluding.

Zurita, G., Nussbaum, M. and Salinas, R. (2005) Dynamic Grouping in Collaborative Learning Supported by Wireless Handhelds. *Educational Technology & Society*, **8**(3), 149-161.

One of the most important decisions to be made in a face-to-face collaborative learning activity is how the participating groups are composed. These compositions produce different learning and social interaction results. The ability to change the group member composition in real time and dynamically enables the leveling up of learning results and improvements in the participants' social relationships. Changes in composition also facilitate the analysis of the best criteria to be used in a determined activity. We propose a face-to-face collaborative environment supported by wireless handhelds that allows for dynamic changes in the composition of groups while an activity is underway. Three different group composition changes were carried out in one environment and the outcomes were compared with another, similar environment where no such group composition changes were performed. The results obtained showed significant improvements, both qualitative and quantitative, in the environment where dynamic grouping was used. Moreover, the criteria for group composition that produce different social interaction outcomes were identified.