A Theoretical Framework for Effective Online Course Design

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Abstract

A key, overarching goal for any committed educator is to ensure that the learner has a meaningful and memorable learning experience while achieving the desired learning outcomes. In this paper it is argued that in order to achieve such a goal, a strategy needs to be put in place that is capable of providing students with a fully integrated, all-encompassing learning environment. The reasoning, simply stated, is that learning will not necessarily emanate from one specific source and, when it happens, it will occur through different means for different people. One of the great strengths of the online learning space is that, through harnessing the power of the various information and communication technologies (ICTs), there is greater scope for catering to individual learning needs. With this in mind, the paper puts forward a framework that comprises a number of overlapping "sub-environments" that, together, provide the scaffolding considered essential for the construction of a truly holistic learning environment. To illustrate how this framework for effective online learning can be operationalised, the authors refer to the case of Universitas 21 Global, an institution which offers completely online programs to post-graduate students in more than 50 countries around the world.

Introduction

Online delivery of education can no longer be regarded as a fad or confined to the realm of the nerd. The point of departure in this paper is that, after centuries of very little change in educational methods, we are now on the brink of a major paradigm shift in which a key factor is the "disruptive technology" of eLearning (Hart & Christensen, 2002). This development is to be welcomed because of the vast opportunities it presents to people who are currently poorly served or not served at all by educational institutions. However, while the benefits of this technology-facilitated liberation of education are well documented (see, for example, Williams & Goldberg, 2005), eLearning continues to suffer from the "Shangrila" syndrome – people talk about it but they

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do not know how to get there. One of the reasons for this is that eLearning, while now firmly established in practice, is still in its infancy as a body of knowledge. It is possible to draw to a certain extent on the distance education literature, but as Calvert (2005: 227) observes, "its models and methods are under challenge by the online revolution". A grand, unifying theory of eLearning thus remains elusive and eLearning practitioners continue to operate largely on the basis of trial and error (Nichols, 2003).

This paper represents a modest attempt to contribute to the fledgling body of knowledge with respect to eLearning theory. It puts forward a "holistic learning environment" framework that is neither grand nor unifying, but one that is useful in terms of organising one's thinking when contemplating online learning design. Comprising a number of overlapping "sub-environments', this framework provides the scaffolding that the authors consider essential for the construction of a truly integrated and effective online learning environment; one in which students becomes thoroughly engaged with their learning on a number of different dimensions, giving rise to an authentic and meaningful learning experience.

The "proof of the pudding is in the eating," of course, and to demonstrate how this theoretical framework has been operationalised, the authors refer to the case of Universitas 21 Global (U21G), a completely online institution offering degree-level courses to over 1200 post-graduate students in more than 50 countries around the world. The flagship program is the Master of Business Administration (MBA) program which has been offered since mid-2003. The learning design for this program is based on the theoretical framework described in this paper.

Background

U21G is an online graduate school owned by 16 member universities of Universitas 21 consortium (McGill University, University of British Columbia, University of Virginia, University of Birmingham, University of Edinburgh, University of Glasgow, University of Nottingham, Lund University, University of Freiburg, University of Melbourne, University of New South Wales, University of Queensland, University of Auckland, National University of Singapore, University of Hong Kong, and Fudan University) and one of the world's largest publishers, Thomson Learning. As long-established and highly reputable institutions, the universities are particularly concerned with preserving their international reputations; hence, a separate, external quality assurance body, U21pedagogica (U21p) has been set up to maintain quality control. This external body has had a very strong influence on the direction taken by U21G to the extent that there has been absolutely no compromise on quality. The institutional culture that has developed as a consequence is captured by the oft-quoted phrase within U21G: "someone has to get it right, and it might as well be us!". This sentiment takes on greater significance, of course, in the context of a number of celebrated eLearning failures (e.g. UKeU; NYU online; and Fathom).

The target audience for the MBA program is working adults, the large majority of whom hold middle management positions. The average age of students is 35 years old, average work experience is 11 years, and the majority are married (72%). No fewer than 83% travel to other countries in the course of their jobs. These students tend to fall into two camps: (i) individuals who are highly motivated and who have selected U21G from a list of possible educational providers; and (ii) employees of corporations that have selected U21G to provide educational programs to suit internal corporate management development objectives. The latter category of students tends to be motivated as much by external factors, such as their company's policy on graduate-level continuing education and promotion, as by social factors within the organisation.

These characteristics have been taken into consideration in the design of the courseware and the learning environment that is provided for the students. It is not just a question of delivering online courseware and letting the student "sink or swim'. There is a determination to provide these adult distance learners with a holistic environment in which knowledge is presented in an authentic context with the settings and applications that would be of immediate relevance to the learner. In

this environment, learning is acquired through opportunities for reflection and active construction of knowledge as well as by means of social interaction and collaboration.

To date, progress has been very encouraging. Aside from attracting more than 1000 students in a little over two years – a statistic that would likely be the envy of many business schools around the world – the feedback from student evaluations of subject and faculty has been very positive, and certainly beyond initial expectations. In the first 18 months of the MBA programme, the aggregate student evaluation of faculty (SEF) score was 4.1 out of a possible 5.0 (an approval rating of 82%), and the aggregate student evaluation of subject (SES) score was 4.2 out of 5.0 (an approval rating of 84%). These results also have to be viewed in the context of subjects being offered every month as U21G does not observe a semester system, and the fact submission of evaluations is a requirement if the students want to receive their final grades.

The U21G learning design has also received external recognition through the award of Certification of eLearning (CEL) for its MBA program by the European Foundation for Management Development (EFMD). The CEL accreditation standard is geared towards educational programs incorporating online learning. The EFMD created the European Quality Improvement System (EQUIS) which accredits tertiary management programs and is one of the main international accreditation bodies (the other being the Association to Advance Collegiate Schools of Business (AACSB)). The fundamental objective of the CEL program is to raise the standard of eLearning programs worldwide through the facilitation of standard setting, benchmarking, mutual learning and the dissemination of good practice. U21G is one of the first accredited institutions along with the Open University in the UK.

Defining Features of the U21G Learning Design

The U21G learning design considers the principles of adult learning, distance learners and their learning styles and, indeed, their life styles. From the work of Rogers and Freiberg (1994), Cross (1981) and Knowles (1984), seven key principles can be identified that underpin effective adult learning:

1. Significant learning takes place when the subject matter is relevant to the personal interests of the adult learner.
2. Adult learning programs can capitalise on the wealth of experience of participants.
3. Adult learners must understand the rationale and purpose of their learning.
4. Adults need to be involved in the planning and evaluation of their learning.
5. The experience of adult learners (including mistakes) can provide the basis for learning activities.
6. Adults are most interested in learning material that has immediate application to their job or personal life.
7. Adult learning is problem-centric rather than content-specific.

When it comes to learning from a distance, the U21G model acknowledges that when learning in isolation and faced with many competing interests on their time such as family commitments and work in the office, the element of motivation is a crucial issue for adult learners. Major challenges include the lack of face-to-face communications with classmates and professor and the absence of instantaneous responses to their questions and input. A key element of the U21G learning design for overcoming these challenges is opportunity for regular interaction, whether it be accessing self-assessment exercises, Macromedia Flash animations, simulations and hyperlinked multimedia, or asynchronous discussions with fellow students and professors. The goals are to ensure that learning is meaningful and focused and to ensure that the learner "stays the course" as a result of becoming motivated to take responsibility for his or her own learning. Importantly, this taking of responsibility occurs while the learner remains very much connected

with a learning community in which students" motivation of one another to progress becomes a daily phenomenon. In the process, the self-esteem of the learner is maintained and increased as he or she proceeds through the course.

The strategy, therefore, is to ensure that the learner has a meaningful and memorable learning experience while achieving the desired learning outcomes. To this end, U21G is committed to providing a holistic learning environment based on two fundamental assumptions: (i) learning will not necessarily emanate from one specific source, and (ii) when learning occurs, it will occur in diverse ways for an equally diverse group of people. In such a holistic learning environment, the following scaffolding is considered essential: the instructive environment, the situating environment, the constructive environment, the supportive environment, the communicative environment, the collaborative environment, and the evaluative environment (Teo, 2003). These "sub-environments" are designed within, outside, and around the courseware, the emphasis being on the transfer of knowledge to the learner's current or future work setting as opposed to a learning of knowledge within the confines of subject content. In so doing, students can cultivate the habits of effective managers: reading, reflecting, analysing, communicating, debating, collaborating and providing recommendations about future directions.

The Instructive Environment

The basic element in learning – the content – is developed according to specific learning needs and achievable objectives. These needs and objectives are essential components of a meaningful learning experience, providing learning satisfaction and motivation for moving on to complete the whole subject. This is treated very seriously at U21G and, in keeping with principle 3 identified above, each topic normally ends with a summary of the knowledge learnt that serves as a "take-away" for the learner.

Domain knowledge is provided by leading academics from around the world drawn largely (but not exclusively) from the U21 universities. These people are experts who are intimately acquainted with the current trends and global developments in their discipline areas. Significantly, the content ultimately produced amounts to little more than a textual outline of concepts and theories. Various instructional strategies are employed using appropriate media (graphics, animation, simulated scenarios and exercises) to bring this outline to life. Supported with real cases and examples of business successes and failures, the domain knowledge is thus presented to the students in a highly engaging manner that serves to facilitate their learning.

Overall, the emphasis is on the application of the concepts and theories to real life situations. In terms of Bloom's taxonomy of cognitive objectives (Bloom, 1956), learners are exposed to learning outcomes that contribute to knowledge and comprehension, to application and analysis, but more often to synthesis and evaluation. Learning activities are designed to ensure that the learner grasps the knowledge easily, retains the knowledge successfully, and is capable of transferring the knowledge through application in a real world situation. To do this effectively, U21G provides the learner with situating and constructive environments in the form of cases, simulations, discussions, summative final projects, and final examinations.

The Situating Environment

At U21G it is considered important that subject content not be treated as something self-contained, quite separate and independent of the situations in which it is applied and used. In accordance with principle 1, students must have empathy for what they are doing if there is to be deep learning. The activity and context in which learning occurs are, in fact, integral parts of the process rather than something ancillary to learning. In other words, "knowing what" and "knowing how" go "hand in hand'.

The model of situated cognition is based upon the notion that knowledge is contextually situated and is fundamentally influenced by the activity, context, and culture in which it is used (Brown et al 1989). Learners need more than abstract concepts and generic examples – they need "full-blooded', authentic activity.

This need is acknowledged in the case of U21G in that the transfer of knowledge from the instructive environment to the real-life environment is made concrete by situating the learner in the environment of their own culture and context through authentic activities. Embedded within these authentic activities are the working practices and cultures of the real world that serve to initiate the learner in ways that would not be possible in a more traditional learning environment. Applying principle 7, situating learning allows the student to gain a better appreciation of the unstructured nature of real world problems and to learn how to go about breaking down a task into operations and then into actions. Importantly, at the conclusion of each simulated situation, the learner is brought back to the key learning objectives through a closing summary. This allows for reflection and reinforcement of the lessons learnt through application elsewhere in their lives (principle 6).

In an increasingly dynamic international business environment, U21G is conscious of the need to situate the learner in a multi-cultural setting. To this end, there is a commitment to make subjects truly international, providing where necessary a counter-balance in the courseware to any perceived US- or Euro-centricity that may evident in the prescribed textbook for a subject. This commitment extends beyond the use of international examples and cases to scenario design, where there is an attempt to strike a good balance in terms of the race and ethnicity of the characters used in animations and simulations. Whenever audio is used, there is also a determination to select voice-over with an accent that is not readily identifiable with any particular country. As suggested by those advocating situated cognition, care is taken to ensure that the learning scenarios devised by U21G are varied in format and style to avoid the danger of "over-situating'.

The Constructive Environment

In keeping with the burgeoning academic literature on constructivist learning that has come to dominate mainstream educational thinking, particularly over the last decade or so, U21G is firmly of the view that learners should not be passive receptacles of information. As articulated by Marton and Säljö (1976a, 1976b), Biggs (1987, 1993) and Ramsden (1992), this educational philosophy posits that meaning is not imposed or transmitted by direct instruction; rather it is created (constructed) by the students' learning activities. This perspective diverges from the instructivist (objectivist) view of education that presumes that knowledge exists independently of the knower and that understanding is coming to know what already exists. The constructivists argue that deep learning will occur only when the learner is actively engaged in, operating upon, or mentally processing incoming stimuli. In short, constructivism focuses on knowledge construction, not knowledge reproduction (Herrington and Standen, 2000).

Collins and Ferguson (1993) propose epistemic tools as the basic building blocks for knowledge construction to help learners recognise, judge and organise patterns of information and engage in constructive inquiry. These epistemic forms (or "target structures') appear in the U21G courseware in the form of interactive exercises such as listing, development of comparison tables, and mind-mapping. Other tools such as personal note-pad, a whiteboard and application-sharing further enhance the opportunities for constructive activities both individually and collaboratively.

The constructivist philosophy is also evident in the case-based, problem-solving approach favoured by U21G. The main vehicles for student learning within this context are contributions to discussion forums and the assignments in which students become engaged. As they engage in learning activities, U21G students not only construct their own knowledge but also return this newly constructed knowledge back to the system, thus adding to the knowledge base (Looi,

1998). Exhaustively-debated discussion topics provide students with the chance to constantly refine their knowledge as they share in one another's experiences of successful and failed projects, boardroom battles, and other "war stories" (principle 2). There are opportunities to learn from mistakes, too, as students compare their efforts on assignments against those of their peers that have been identified as exemplary works and published for public view (principle 5). Overall, the structure of the learning design is such that it capitalises on the vast collective experience of adult learners, experience that provides a multitude of context-rich, simulated scenarios and case studies.

The learning activities in any given subject at U21G culminate in the final assessment item – the open-book, open-Web (OBOW) examination. This examination serves as the capstone on the building blocks for knowledge construction. Unlike the traditional examination instrument found in many higher education settings, this examination embodies a concern for authenticity of inquiry and the learner's work culture and context (Williams 2005b).

To summarise, the constructive environment, in concert with the instructive and situating environments, provides a cohesive setting for learning to the extent that the acquisition of new knowledge, its application, and its transfer to different contexts is made as seamless as possible.

The Supportive Environment

There are two basic categories of support available to assist learners in their accomplishment of learning outcomes: performance support and cognitive support. Performance support comes in the form of tools for the execution of certain tasks that are required for achieving certain objectives, either specific to a topic or segment of study, or general to the subject or course. Examples of such tools include management software, cost-calculation tools, project scheduling tools, tables of formulae and economic status tables, all of which are standard features of the U21G model.

Cognitive support is provided mainly by people who supply the coaching, mentoring and feedback to the learner. Given the adult learning context of U21G, this is not limited to the professor. Applying principle 2, once a learner establishes and builds upon a knowledge base, they can assist with the development of other learners without necessarily having to first acquire "expert" status. Students learn from many different sources and, while the professor is one such source, U21G students are actively encouraged to take advantage of one another's expertise—expertise that they have acquired through their experience in various roles and with various responsibilities.

Further cognitive support is provided through the e-resources that are available, literally and metaphorically, at the students' fingertips. Each subject has its own subject-specific library where, for example, all companies discussed, journals used, and associations mentioned in the course of a subject are systematically listed for easy reference. Hyperlinks to respective Web sites are also included in the list. In addition, students have an option to add such frequently visited links to their own personalised online library.

While performance and cognitive support are provided through the courseware, through peers, and through professors, the "time-poor" adult distance learner also needs easily accessible pastoral support to assist with any personal challenges that may be encountered. Technical support to minimise technological disturbances to the learning experience is also of paramount importance. To this end, the U21G Student Services, together with other relevant departments in the organisation, provide proactive support to learners. In furthering the application of principle 4, the Student Services team works with the student to formulate a study plan for the whole program, taking into consideration the individual's work and family commitments and personal interests.

The Communicative Environment

Distance education has long been associated with the notion of the "hermit learner', and an experience akin to the "loneliness of the long distance runner'; i.e., a student learns on his or her own, largely remote from other learners. Since people, generally speaking, are social beings with a sense of belonging, it is possible to become alienated from the learning process if interaction with other learners is minimal. In such circumstances, the communicative environment takes on added importance because, acknowledging principle 4, it allows the learner to become integrally involved with the course of their learning.

At U21G, there has been a determination to deliver a brand of distance education that embraces the communicative environment to the extent that, while they may be in remote locations, students should not feel remote from their fellow learners. The courseware is written in a "conversational" style to create a more personal and approachable interface for the student. Email and threaded discussion, meanwhile, form the bedrock of the U21G communicative environment, aided and abetted by the increasingly widespread use of instant messaging and audio-conferencing (with the option of Web-cams), all of which have contributed to development of a buoyant and energetic community of learners.

The mere existence of such tools does not mean, of course, that there will necessarily be active participation by all concerned, but the proactive stance taken by the faculty and student support services at U21G has served to create a culture where this is the norm rather than the exception. In fact, the attrition in the MBA program was approximately 5 per cent over a two-year period, whereas distance education is notorious for high drop-out rates, particularly in more traditional, paper-based programs. Kember (1995), for example, reports attrition rates ranging from 28% to 99.5%!). Active personal guidance through feedback from professors and support staff that is timely and constructive is critical in this regard: there is an expectation that emails will be attended to within 24 hours, learners are assured of the receipt of assignments submitted to the professors, and evaluation of a submitted assignment is provided to the learner with a seven day turnaround.

The Collaborative Environment

Working in teams has become a common feature of modern workplaces (Senge, 1990). As a result, many tertiary institutions have sought to develop this particular generic skill among their graduates. Aside from its perceived value in the world of business and commerce, there appears to be little argument about the value of working in teams from a pedagogical point of view because of the benefits that accrue from peer learning (Kadel & Keehner, 1994).

At U21G, team work is an integral part of the curriculum in both an informal and formal sense. Informally, there is the team work that goes with being part of a learning community; e.g. working together on a discussion board to enhance collective understanding. More formally, it is a requirement of every subject that all students complete at least one team-based case analysis. Teams are not just a convenient way to aggregate the individual knowledge of their members; applying principle 2 once again, they give rise, synergistically, to insights and solutions that may otherwise have not come about. This mode of problem solving is therefore regarded as a critical piece of scaffolding for learners in the knowledge acquisition process.

End-of-segment assignments and final projects are designed to promote collaboration among learners; there is dedicated work space for teams to make announcements, engage in threaded discussion, and share files. Teams are allowed to self-select which they do via a discussion board set up for the specific purpose. It is not assumed, however, that all students will be willing or able to work effectively in teams. Those individuals not participating in this exercise are allocated a team by the professor. Tips on how to work successfully in online teams are also provided wherever collaboration is required. The collaborative environment is, of course, highly contingent

upon the communicative environment, and *vice versa*. The completion of team assignments provides an all important social dimension to learning; however, this can be counter-productive if the collaborative and communicative environments are ineffectual.

The Evaluative Environment

At U21G, formal and informal formative evaluations take place throughout each subject. Acknowledging principle 4, there are pre-content exercises to let learners gauge the level of their expertise before engaging with the content, exercises after an expository topic to allow learners to practice the principles learnt, and discussion topics and review questions to foster critical and constructive evaluation of one's thinking. Self-assessment at the end of each topic helps the learner to check his or her own understanding before moving on to the next topic.

Assignments, both individual and collaborative, and the final exam are assessed by the professor according to a set of generic criteria and a standardised grade descriptions document. The grade descriptions document is of critical importance given U21G draws on the services of more than 80 adjunct professors from all over the world, each with their own traditions and ideas about grading and grading standards.

For evaluation of collaborative work, team members are required to complete peer assessment at the conclusion of each project. The peer assessment tool (which draws on SPARK developed by the University of Technology, Sydney) determines the individual's share of the team grade. If it is clear that there is value in peer learning, and there are learning objectives concerning students" ability to work as part of a team, then there has to be some effective means of assessing teamwork (Williams, 2005a).

All these mechanisms are designed to provide the learner with a consistent and accurate indication of their progress in the course. This is important in the context of Principle 6 and the emphasis that adult learners place on learning effectiveness. With regular, high quality feedback validating their learning, they can be more confident of making the connection between what is learnt and how it might be of immediate relevance to their job or personal life. Here, again, the situating and constructive environments play an important role.

Summary and Conclusions

The main objective of this paper has been to contribute to the general discussion on the theory of eLearning. As contributors to a relatively young and evolving body of knowledge, we may be some distance from anything that resembles a grand, unifying theory of online learning, but some sort of theoretical superstructure is clearly required if eLearning is to truly "come of age'. This paper represents a modest attempt on the part of the authors to add some momentum to this theoretical inquiry. The case study of U21G has been used to illustrate how, within an institutional culture characterised by its strong commitment to quality assurance, it is possible to develop a successful eLearning model by design rather than by accident. Significantly, the holistic learning environment framework described above has produced a versatile model for eLearning. The program of study that has grown from it is proving to be popular with the adult distance learners that U21G aims to attract largely because it caters to the diverse needs of individual students. In such an environment, learning is acquired through opportunities for reflection and active construction of knowledge as well as by means of social interaction and collaboration. The careful and deliberate consideration given to the planning and design of the learning events so that the various sub-environments are integrated and blended makes for an authentic and meaningful learning experience.

References

Biggs, J. (1987). *Student Approaches to Learning and Studying*, Australian Council for Educational Research, Hawthorn, Victoria.

Biggs, J. (1993). What do inventories of students" learning process really measure? A theoretical review and clarification, *British Journal of Educational Psychology*, 83, 3-19.

Bloom, B.S. (Ed) (1956). *Taxonomy of educational objectives: the classification of educational goals: Handbook I, cognitive domain,* London, Longman Group.

Brown, J.S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher,* 18(1), 32-34.

Calvert, J. (2005). Distance education at the crossroads. *Distance Education,* 26(2), 227-238.

Collins, A. & Ferguson, W. (1993). Epistemic forms and epistemic games: Structures and strategies to guide inquiry. *Educational Psychologist*, 28(1), 25-42.

Cross, K.P. (1981). *Adults as Learners*. San Francisco: Jossey-Bass.

Hart, S. & Christensen, C. (2002). "The great leap: driving innovation from the base of the pyramid'. *MIT Sloan Management Review*, 44(1), 51-56.

Herrington, J. & Standen, P. (2000). Moving from an instructivist to a constructivist multimedia learning environment, *Journal of Educational Multimedia and Hypermedia*, 9(3), 195-205.

Kadel, S. & Keehner, J.A. (1994). *Collaborative Learning: A Sourcebook for Higher Education*, Vol. II. University Park, PA: National Center for Postsecondary Teaching, Learning and Assessment.

Kember, D. (1995). *Open Learning Courses for Adults: A Model of Student Progress*. Englewood Cliffs, NJ: Educational Technology Publications.

Knowles, M. (1984). *Andragogy in Action*. San Francisco: Jossey-Bass.

Looi, C. K. (1998). Interactive learning environments for promoting inquiry learning. *Journal of Educational Technology Systems*, 27(1), 3-22.

Marton, F. & Säljö, R. (1976a). On qualitative differences in learning – 1: outcome and process, *British Journal of Educational Psychology*, 46, 4-11.

Marton, F. & Säljö, R. (1976b). On qualitative differences in learning – 2: outcome as a function of the learner's conception of the task, *British Journal of Educational Psychology*, 46, 115-27.

Nichols, M. (2003). A theory for eLearning. *Educational Technology & Society*, 6(2), 1-10*,* Available at: http://ifets.ieee.org/periodical/6-2/1.html [Accessed 15 December 2005].

Ramsden, P. (1992). *Learning to Teach in Higher Education*, Routledge, London.

Rogers, C.R. & Freiberg, H.J. (1994). *Freedom to Learn* (3rd edn). Columbus, OH: Merrill/Macmillan.

Senge, P. (1990). *The Fifth Discipline*, London: Century Business.

Teo, S. (2003). Towards a total learning environment for the distanced adult learner. *World Conference on E-Learning in Corp., Govt., Health, & Higher Ed. 2003*(1), 1213-1216.

Williams, J.B. (2005a). "Foiling the free riders: Early experience with compulsory peer assessment at an online business school'. In Danson, M. Proceedings of the 9th International Computer Assisted Assessment (CAA) Conference, pp. 497-501. Available at: http://s-d.lboro.ac.uk/caanew/pastConferences/2005/proceedings/WilliamsJB.pdf [Accessed 15 December 2005].

Williams, J.B. (2005b). "The place of the closed book, invigilated final examination in a knowledge economy', *Educational Media International*, 42(4), 375-387.

Williams, J.B. & Goldberg, M. (2005). "The evolution of eLearning'. 22nd ascilite conference, Brisbane, Australia. Available at: http://www.ascilite.org.au/conferences/brisbane05/blogs/proceedings/84_Williams.pdf [Accessed 15 December 2005].