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Investigating staff capabilities and needs for effective use of online technologies

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Abstract: Common to all higher education institutions is the need to reform and change the curriculum to prepare students to become citizens in a world of knowledge-based economies (Bates, 2005). Students today need skills and abilities to work in teams, to cooperate, collaborate and learn with fellow students and staff in a community of learners. Within these communities learners need to be able to solve real world problems and be self-directed active learners constructing knowledge. This shift towards more active learning demands a more student-focused approach to the process of learning and teaching in higher education (Prosser & Trigwell, 1999) and that well-designed active learning is an effective way for student learning (Biggs, 2003; Ramsden, 2003; Healey & Roberts, 2004). There is also a growing body of evidence that technology applied to learning and teaching supports extended active learning in and out of class (Paulson, 2002; Williams, 2003). But ‘technology-enhanced learning demands that both technological and methodological abilities are put into play’ (Trentin, 2006, p. 182) and that it is difficult to find all these abilities in a single person. ‘However good a teacher might be in class, he/she may fail in a distance learning situation if lacking sufficient familiarity with technology-enhanced learning methods’ (Trentin, 2006, p. 184). This research suggests that faculties and universities as a whole need to pay close attention to staff capabilities and their use of technology and to offer staff development in ways that will best afford opportunities to improve on and re-think the way they teach and their students engage in learning through technology. Research undertaken in this paper investigates one faculty’s use of an online learning environment and a support structure that builds staff capabilities in using online technology to engage students in effective collaborative and meaningful real world activities.

Keywords: capacity building, technology application in higher education, staff development

Introduction

Common to all higher education institutions is the need to reform and change the curriculum to prepare students to become citizens in a world of knowledge-based economies (Bates, 2005). Students today need skills and abilities to work in teams, to cooperate, collaborate and learn with fellow students and staff in a community of learners. Within these learning communities learners need to be able to solve real world problems and be self-directed active learners constructing knowledge. This shift towards more active learning demands a more student-focused approach to the process of learning and teaching in higher education (Prosser & Trigwell, 1999) and there is a growing body of evidence that well-designed active

learning is an effective way for student learning (Biggs, 2003; Ramsden, 2003; Healey & Roberts, 2004). There is also a growing body of evidence that technology applied to learning and teaching supports extended active learning in and out of class (Paulson, 2002; Williams, 2003). But ‘technology-enhanced learning demands that both technological and methodological abilities are put into play’ (Trentin, 2006, p. 182) and that it is difficult to find all these abilities in a single person. ‘However good a teacher might be in class, he/she may fail in a distance learning situation if lacking sufficient familiarity with technology-enhanced learning methods’ (Trentin, 2006, p. 184).

Studies conducted in higher education identify the inexperience and weak background of those who venture into attempts to use these technologies as a main reason for the failure of elearning (Irani, 2001; Brogden & Couros, 2002; Bates, 2003; Howell *et al.* 2004). Based on this research it is clear that faculties and universities as a whole need to pay close attention to staff capabilities and their use of technology and to offer staff development in ways that will best afford staff opportunities to improve on and re-think the way they teach and their students learn when using technology.

At the university in this study, one faculty was identified to conduct research into how its teachers use technology-enhanced learning to support their teaching and their students’ learning and to identify what support is necessary to help teachers use the technology more effectively.

The study made a number of assumptions underlying the use of technology which are outlined below. Firstly, that effective use of technology enhanced learning cannot be accomplished by technology solutions alone. Secondly, that technology integration must be embedded into a larger process of educational reform, innovation and change. Thirdly, that technology integration into education requires pedagogical intervention from teachers as well as larger scale organizational and management intervention. Fourthly, that technology development and support for learning and teaching must be accompanied by suitable professional development opportunities.

Outcomes of the initial investigation (Fox, in press) into faculty use of technology highlight the following needs:

The faculty needs a careful, considered and planned approach which supports changes and improvements to teaching and learning as well as providing administrative support at both university and faculty levels. A balance needs to be established between using technology to *supplement* current practice and using it to *replace* certain existing practices.

More specifically, technology enhanced learning could be used to target projects that

are strategically important across the faculty. Technology enhanced learning could be used to replace existing resources and practices instead of being used simply as an additive supplementary resource for teaching and learning. Technology use needs to be continually assessed and as far as possible to be kept strategically focused on earmarked projects.

As different individuals use technology in very different ways and for a wide range of purposes, faculty resources should, as far as possible, target its use which is critical to curriculum reform and innovation and which provides overall benefits for the course, the program and the department(s).

Teachers have a range of practices and interests in using technology in education. The support provided to academic staff needs to be similarly broad based. However it is not possible to provide support for everyone and at all levels. Assistance therefore should be given to projects that are sustainable, transferable and scalable. Staff development activities should be geared to providing support for ongoing rather than special 'one-off' activities, aiming to encourage 'a ripple effect' in the impact, gradually increasing staff interest in a range of good practices and in the use of technology to improve student learning.

In conclusion, there is much that can and should be done to support integrating technology into the learning and teaching. However, the drive to adopt technology must be matched with careful, considered, planned and monitored initiatives that are fully supported, understood, recognised and properly rewarded.

A number of common issues were identified in the initial study that needs to be taken into account in advancing the use of technology in teaching and learning contexts in pedagogically appropriate ways. Successful integration of technologies depends on factors which include the provision of co-ordinated, well-integrated and strategically considered programs and projects supported by documents and policies which are well disseminated to avoid lost opportunity and wasted energy. In particular, the initial study identified the following areas which need to be addressed:

Developing frameworks

- A clearly articulated framework on integrating technology into the curriculum based on critical and pedagogic concerns, related to the university and faculty strategic plans, especially teaching and learning plans, to ensure overall direction and focus is maintained.
- A focus on teaching and learning issues, rather than an exploration of the potential of technology.
- A strategic, rather than a 'scatter gun approach' to selecting, designing, developing and implementing e-learning into the curriculum.

- A considered balance between technologies used to supplement OR to replace existing teaching and learning practices.
- The growth in using technology is facilitated by planned IT infrastructure and support which is appropriately resourced and maintained. E.g. online enrolments match developments in (blended) online courses and increased open access facilities for students.

Staff development

- An ongoing, rather than a series of ‘one-offs’ approach to staff development is required. Although the emphasis of this staff development is likely to focus on academic staff, administrative and technical staff also need ongoing staff development to ensure co-ordinated support and a continued focus on teaching and learning issues.
- A close examination of academic support services to ensure appropriate structures are in place which facilitate the attainment of goals set within the teaching and learning plans.
- The encouragement of staff to work in teams both in the development of e-resources and materials as well as in the teaching and evaluation of the courses. This will increase the stakehold and commitment to the projects developed and will increase the sustainability of what is developed as the project would not need to rely solely on a single individual.

Resourcing

- A strategic approach to integrating technology into the curriculum must be matched by appropriate financial, technical, administrative and instructional design support.
- Clear co-ordination and articulation between central, strategically funded initiatives which are supported by a co-ordinator of all projects to ensure: a) appropriate liaison between parties involved; b) dissemination of information between projects and through the Faculty community; c) projects remain focused and on target.
- Financial support be granted only when projects have clearly articulated an ongoing maintenance strategy of the project and appropriate monitoring and evaluation is ensured.

Recognising the impact of technology enhanced learning

- Recognition that the impact of technology enhanced learning on the curriculum and on work practices will continue to grow. Technology itself can skew the direction of its use and therefore should be continually monitored to ensure that it provides the support required. There are multiple issues confronting the use of ICT which need to be addressed, including:
 - increased pressures on academic staff time;
 - blurring and changing roles for academic and general support staff;
 - the need for changed work practices and a willingness to work differently with different groups of people in new ways;
 - (in)appropriate uses of technologies;
 - access and costs to students;

- increased costs to the university and the faculty;
- copyright issues in online environments; and
- innovation and change: how we overcome the chasm (Moore & McKenna, 2002) between early adopters and the mainstream.

Project aim

Taking into account the above broad study findings, this project focuses on the use of the online Interactive Learning Network (ILN), which supports collaborative learning, within the faculty involved in the research. ILN is a community-building environment designed to scaffold virtual education communities of practice where teachers and students work together as teams and engage in reflective, collegial interaction and patterns of working. ILN facilitates cognitive and social scaffolding, enabling participants to become progressively more involved in the community and to sustain their commitment and interests. This environment is designed to support pedagogies that emphasize the emergence and growth of autonomous collaborative learning, rather than teacher-directed delivery of learning materials (Trinidad & Fox, in press). This project aimed to promote and enhance collaborative and community building use of ILN in teaching programs through:

- Identification of individual teaching program needs and the potential role of ILN to meet needs where appropriate.
- Identification and dissemination of exemplars of good practice in collaborative learning and community building using ILN within Faculty programs.
- Identification and change to the ILN environment, administration and management to meet ongoing faculty teaching program needs.

Project tasks, timelines, roles and deliverables

The project has three aims: to identify program needs and the potential role of ILN to enhance the programs; to identify and disseminate exemplars of good pedagogic practice in collaborative learning and community building using ILN; and to identify and change the ILN environment, administration and management to meet Faculty program needs. The eight main tasks in the project are:

- Identifying existing practices in the use of ILN across Faculty teaching programs.
- Identifying teaching programs needs
- Identifying administrative and technical mechanisms that support teaching program needs
- Implementing administrative and technical improvements to meet program needs
- Identifying and disseminating examples of good practices using ILN
- Establishing a good practices online community
- Evaluating the project

- Reporting on the outcomes

Project progress

To date, the project has explored various existing practices, in the use of ILN across all Faculty programs. Existing practices can be identified under the following main headings using Trentin's (2006) categories, namely: informative use, distributed use, interactive use, blended solutions, content-driven learning, and networked learning.

Informative use: the most basic use of ILN is providing information to students and staff about the course(s) taken. This information is uploaded mostly by course administrative secretaries and sometimes technical staff, course coordinators and teachers and includes general and specific announcements, examination dates, etc. The investigation into ILN use found this category the most popular. All course rooms included this information though there was no standard way of providing this information. From course to course and module to module administrators and tutors had uploaded separate items and positioned the information in a variety of ways and places, sometimes in the announcements page and at other times embedded into resources folders under obscure headings. Generally old and outdated information was placed next to new information even though there may be conflict between the information given. In interviews with staff, it was often unclear who was responsible for maintaining the information presented and who should be responsible for keeping the information up to date and discarding old information when it was no longer relevant.

Distributive use: teachers place lecture notes, PowerPoint presentations, reading summaries, etc. in the course room. However, again there is no standard way this material is located, with each course module having different ways of housing the information. Sometimes teachers would at the start of the semester, establish special folders for separate topics but later abandon most, placing all materials in just one folder, leaving the remaining folders empty. Often materials were embedded in folders which were in turn in folders but without any explanation or rationale for doing so. Students who were at times given access rights to upload materials or responses to teacher notes online often placed their resources in separate and unconnected folders.

Interactive use: where interpersonal communication was encouraged. The types of interaction occurring between teachers, administrators and students varied greatly between modules. In general, the online communication was divided into the following types:

- one-to-one, student to student or student to/from teacher requests and responses to requests for information or help
- one-to-many, teachers using (a)synchronous messaging
- many-to-many, using discussion forums, chat rooms where teachers and students and student groups would interact

- one-to-group, students working on group tasks within a sub-community forum where only group members and the teacher have access to the discussions
- The forms of interaction mostly identified in the faculty were one-to-one and one-to-many, mostly driven by teachers.

Blended solutions: providing face-to-face class contact with an alternative online class. Blended examples of online classes with the faculty, replacing face-to-face classes were almost exclusively found only in courses specifically developed on the topic of IT and information management programs.

Content-driven learning: the development of specific technology enhanced learning materials, designed for online use. This is distinctly different from lecturer notes and PowerPoint presentations found in the above category, *Distributive use*. These standalone technology enhanced learning materials and processes were rare within the faculty and again were found only in the IT and information management courses.

Networked learning: where courses are underpinned by a network of interrelationships that link participants and teachers in a community to collaborate, work together in pursuit of specific learning goals. Network learning requires more sophisticated network management skills by teachers. This form of communication was growing in popularity across the faculty though with varied degrees of success. Some teachers and students complained that activities in networked learning tended to be time consuming, demanding and for some offered minimal rewards. Some students complained that activities required in some modules were duplicated in others suggesting the necessity of course teams to coordinate their work.

Networked learning and building online communities was identified by staff as an area that they would most like to learn how to improve. The next section of this paper examines two frameworks that will be used to help staff use technology-enhanced learning in a networked environment (ILN) more effectively.

Two frameworks used to guide effective teaching and learning using ILN

This project is concerned with encouraging Faculty staff to become engaged in the more sophisticated uses of the online technology, namely networked teaching and learning through ILN. NCEL (2004) states “the integration of new and powerful technologies in our educational institutions and increasing emphasis on higher-order skills in curriculum content will not bring about the broad changes required without essentially changing the ways teachers and learners work together”. How does one change the way staff and students work together through technology-enhanced learning within a networked environment?

This project proposed to develop technology-enhanced learning and teaching through a networked environment (ILN) using two frameworks, one structural and one evaluative, to

help transform staff teaching and student learning. There are many ways to enhance the learning process through networked technology. Most teaching and learning processes employ one or more of these activities including communication; research; using higher order thinking skills like graphic organizers; authentic assessment tasks and presentation of knowledge learnt (Theroux, 2005). The pedagogy, content, and delivery processes can be used to help change ways teachers and learners work together in a networked environment. The first structural framework was based on work done by Herrington et. al. (2002) and Oliver & Herrington (2001) who describe three components considered important when reviewing content, developing new resources and providing staff development and training. These are **pedagogies**, the learning tasks which underpin the module, unit or course; **resources**, the learning content and information which are provided for the learners; and **delivery strategies**, or learning supports associated with the ways in which the module, unit or course is delivered to the learners (Figure 1).

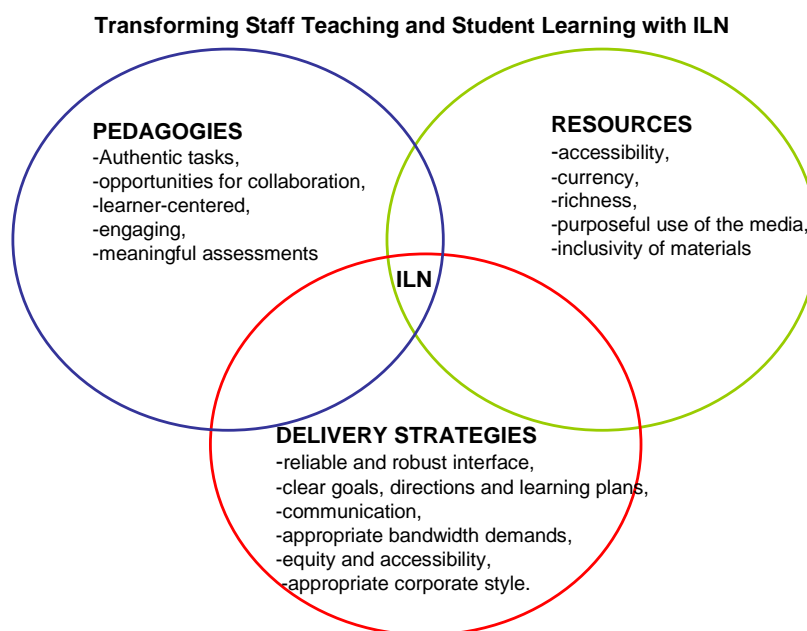


Figure 1: *The Structural Framework for Levering Change using ILN.*

Source: Herrington et. al. (2002) and Oliver & Herrington (2001).

This framework offers important design and structural considerations in a networked community which can be used by staff for technology-enhanced learning. With learning tasks, the activities, problems, interactions used to engage the learners and on which learning is based, needs to be pedagogically sound with authentic tasks, opportunities for collaboration, learner-centered activities that are engaging using meaningful assessments. With learning resources, the content and information that underpin knowledge and with which the learners interact, it is important to have accessibility, currency, richness, purposeful use of the media and inclusivity of materials. With learning supports, the schedules, scaffolds, structures, motivation, assistance and connections used to support learning delivery (ILN) is a reliable

and robust interface, has clear goals, directions and learning plans, communication, appropriate bandwidth demands, equity and accessibility, and an appropriate corporate style.

The second evaluative framework used Mentis, Ryba, and Annan (2002) and Salmon's (2002) model to provide a way for analyzing the perceptions, processes and products of online learning and community building. This framework provides "a systematic and rigorous analysis of the outcomes of online courses and programmes" and has been "used to identify the essential questions and data gathering methods that are required to analyse the perceptions, processes and products of learning at each stage in the development of an online learning community" This framework is outlined below in Table 1 and can be used to help staff systematically monitor the effectiveness of online courses and online learning communities.

Table 1: *The Evaluative Framework for Levering Change*

Stages 1-5	Perceptions	Processes	Products
Development	Do participants become responsible for their own learning and guide newcomers into the online community of practice?	Student Survey. Narrative analysis of posting reflective enquiry. Group feedback & evaluation	Production of collaborative reports & online folios. Increasing self sufficiency of online community
Knowledge Construction	Do students actively participate through formulating their own ideas or constructing their understandings of concepts, theories and practice?	Content analysis to study cognitive & metacognitive skills & knowledge & depth of processing	Quantitative analysis of content confirms increasing depth of processing over time. Diagrams & models are sent as attachments
Information Exchange	Do students help and support one another through information exchange and advice on personal and academic tasks?	Analysis of electronic contributions for indicators of information exchange	Lists of resources. Messages where to locate materials. Personal support offerings
Online Socialisation	Do students get to know one another on a personal basis and begin to work together on common tasks?	Online activity graph of interaction patterns. Analysis of social effects	Formation of working partnerships Moderation of discussion topics & encouragement to participate
Access and Motivation	Do students report feeling welcome and encouraged?	Student Survey Analysis of intro messages	Welcome messages Notes of encouragement

Adapted Five-step model Salmon (2002) with Mentis, Ryba, & Annan (2002) Triple P Alliance framework

Building learning communities online takes effort and hard work by staff who must have a good understanding of what learning should and is taking place, and what needs to be supported by the infrastructure. This includes being able to carefully construct learning tasks, resources and supports that allow students to work in a social context constructing their own knowledge. By using an evaluative framework staff can reflect on what has worked, what

might change and what might be used again when working within the ILN online community. By collecting student's comments and evaluative data throughout the process staff can systematically monitor the effectiveness of the online course and online learning community involved and adjust the learning environment accordingly to help build a stronger online learning community. The next stage of the project will use these two frameworks to further develop online curriculum resources, model best practice and provide staff training in working within ILN.

Conclusion

The paper describes research undertaken to implement a project that would identify program needs and the potential role and use of networked technology (ILN) to enhance Faculty programs; to identify and disseminate exemplars of good pedagogic practice in collaborative learning and community building using networked technology (ILN); and to identify and change the networked technology (ILN) environment, administration and management to meet Faculty program needs. Faculties and universities as a whole need to pay close attention to staff capabilities and their use of technology and to offer staff development that will provide staff opportunities to improve on and re-think the way they teach and their students learn when using technology. Within this project existing practices were identified using Trentin's (2006) categories, namely: informative use, distributed use, interactive use, blended solutions, content-driven learning, and networked learning as part of the first stage of the project. Systemic development of Faculty programs using structural and evaluative frameworks that consider pedagogy, resources and delivery of technology-enhanced learning can play an important role in leveraging curriculum change. Technology-enhanced learning demands that both technological and methodological abilities used by staff need to be undertaken to successfully work and teach in a networked learning environment. This project will use the two frameworks to assist staff improvements and provide further direction to help implement sustainable change.

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