Can we Leave it to Chance? New Learning Technologies and the Problem of Professional Competence

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This paper describes two different university and school collaborations featuring teachers’ and students’ use of online environments. The first example involves a classroom application of a Learning Management System (LMS) to deliver a Year 8 Studies of Society Unit on ‘Rainforests’. This example serves to capture, bracket and examine the ways in which teachers have begun to redefine teaching practice, and to document the ways in which students experience this change in teaching. The second example documents feedback from a formal hands-on professional development program for teachers where follow up support was offered on-line, using the same LMS.

Data presented here suggest that the on-line environment is not a panacea for better teaching and learning outcomes. Example one identifies the means by which the on-line environment is able to stimulate effective learning exchange, yet signposts to the teacher the ways in which the emerging ICT classroom will challenge the technology, logistics, organisation and delivery competencies of many teachers. In example two, technology is painted as a catalyst to other elements of school reform. In both examples, the value of the on-line environment lies in its capacity to enable our collaborative knowledge about teaching and learning to interact so that each becomes a structuring, and constitutive resource for the other.

ICT in the classroom, online teaching and learning, university-school collaboration

INTRODUCTION AND THEORETICAL FRAMEWORK:
BRINGING TEACHERS AND ICT TOGETHER

Recent Australian state and federal policy reforms include high priority initiatives aimed at improving the effectiveness of ICT use in classrooms. The Commonwealth Department of Education, Training and Youth Affairs defines Information Communication Technology (ICT) as relating “to those technologies that are used for accessing, gathering, manipulating and presenting or communicating information. The technologies could include hardware (e.g. computers and other devices); software applications; and connectivity” (Toomey, 2001, p.1). The addition of ‘communication’ to previous terms such as information technology (IT) emphasises the growing importance attributed to the communication aspects of new technologies.
The Commonwealth government has funded a major project “Models of Teacher Professional Development for the Integration of ICT into Classroom Practice”, Downs et al. (2001) along with a separate project to investigate ICT competency standards for teachers with a view to developing national standards. The Ramsey Report (2000) advocated closer links between universities and schools to improve pre-service and teacher professional development. Furthermore, the National Quality Teacher Project (2001, p.3) supports these themes and outlines initiatives involving “the provision of teacher school-based professional development, attainment of national … and international recognised qualifications, and the development of curriculum and system support materials, both on-line and in hard copy”. The importance of online learning in these plans is underscored by the report’s claim (2001, p.3) that “the project will focus on good practice in online teaching and facilitate discussion on how online learners can be supported”.

In Queensland, the recently formed Learning and Development Foundation (2002) claims that “on-line learning is a key component of teacher learning throughout Education Queensland”, and has funded initiatives (including the present study) to investigate the use of online learning environments to support teacher professional development in ICT. The foundation is committed to improving and updating the skills of teachers in priority areas and not surprisingly, ICT heads the list of priority areas on their website. Collaboration with other partners is emphasised by the foundation’s argument that “building relationships with new and varying stakeholders will be critical for optimal organisational performance” (online). The projects outlined in this article involve several of these identified priority areas:

- Enhancing teacher professional development in ICT
- Trialing innovative use of online environments and learning management systems for teachers and students, and;
- Forming partnerships between tertiary education providers, educational authorities, teachers and students

The development described above do not necessarily suggest that a consensus exists around the current priorities of governments, educational authorities and schools to provide teachers with more professional development in ICT. Perhaps the most influential critic of this strategy has been Cuban (2000) who has strongly argued that a lack of technical skills is not holding back the effective integration of computers in the school curriculum. Becker (2000, p.7), however, examined national US data from more than 4000 teachers across 1100 schools and strongly concluded that lack of technical skills was significantly holding back the development of effective classroom practice involving ICT such that

... teachers who have a reasonable amount of technical skill and who use computers to address their own professional needs use computers in broader and more sophisticated ways with students than teachers who have limited technical skills and no personal investment in using technology themselves. (Becker 2000, p.7)

Furthermore Becker and Riel (2001, p.2) found that the more extensively involved teachers were in professional activities, the more likely they were to:

1. have teaching philosophies compatible with constructivist learning theory;
2. teach in ways consistent with a constructivist philosophy, and;
3. use computers more and in exemplary ways.

Their findings also indicated that teachers who were more engaged in professional development had students who often used computers in their classrooms to communicate with people outside the boundaries of the school, to analyse data and to work collaboratively...
and were less likely to use computers for purely developing computer skills or engaging in drill and practice activities.

Teachers’ capacity (henceforth referred to as teacher bandwidth) to use computers in classrooms is not in keeping with the increasing levels and opportunities available to access and appropriate constantly changing technologies (Sandholtz, 2001). A comprehensive study ‘Teachers and Technology: Making the Connection’ cites lack of teacher preparation as a major obstacle to the effective use of technology in classrooms. In the US, a meagre 20 per cent of teachers felt that they were feeling well prepared to integrate technology into their teaching (NCES, 1999). In Australia, Queensland teachers have identified a lack of professional development as a major stumbling block to effective educational use of ICT, and have expressed the view that the lack of funds available made hardware acquisition a higher priority than professional development (Anderson, 1999).

Given that the literature clearly supports increased efforts towards providing teachers with effective professional development in ICT, the next question that needs to be asked is ‘How does online learning contribute to the need for an increased focus on professional development and how can it contribute to enhancing and extending the traditional models of delivery?’ Piguet and Peraya (2000) point out “there are numerous authoring tools that have broadened the base of possible instructional developers and allowed non-programmers, especially teachers, to create their own instructional learning environments” (p.302). Wilson (1995, p.302, cited in Piquet and Peraya) defines common LMS (Learning Management Systems) functionalities as “integrating all of the well established advantages of the world wide web … [and] as a place where learners may work together and support each other as they use a variety of tools and information resources in their pursuit of learning goals and problem solving activities”.

Bohnenkamp and McMahon (2001) cite a recent trial in Indianapolis using ‘Oncourse’ as the web based learning environment involving over 3000 teachers in a combination of face-to-face sessions and online modules to provide professional development in ICT. Although more data are needed to demonstrate the successful claims of the ‘CLICK’ program, the authors conclude that:

after participating in this unique online experience where curriculum is driving the technology, teachers have begun to redefine their role, as well as the role of the technology. CLICK combines the very best professional development with the latest technology to allow teachers to learn at their own pace, with plenty of support, in a collegial environment where they have access to a wide range of instructional resources. (Bohnenkamp and McMahon 2001, p.3)

To this end, staff at James Cook University and Education Queensland identified two local opportunities to improve pre-service and teacher professional development through collaborative efforts. These two different scenarios involving teachers’ and students’ use of online environments are described in this paper. The first example involves classroom use of a LMS to complete a year 8 Studies of Society Unit on Rainforests. It is used in this context to capture, bracket and examine the ways in which teachers have begun to redefine their role, and to document the ways in which students experience this change in teaching. The second example involves feedback from a formal hands-on professional development program for teachers with follow up support offered through an on-line LMS. This second case study is currently being implemented, so in many ways it remains a ‘work in progress’.

**EXAMPLE ONE: YEAR EIGHTS STUDYING RAINFORESTS ON-LINE**

**Aims and Focus of an On-line Pedagogy**

The Year 8 Studies of Society and Environment (SOSE) textbook is (perhaps necessarily) an anthropological and theory-laden text, marked by what Callon (1986) terms ‘obligatory’
passage points of discourse around what ‘counts as social and environmental education’. Its treatment of the ‘Rainforest’ aims to enrol learners in its understanding of ‘rainforest’ issues, at the same time convincing them of the indispensability of existing (and at times ideological) solutions to ‘rainforest’ problems. This kind of textual engagement at some level obviates the need for the student to participate in the search for active solutions, perhaps to the extent that “knowledge is lifted out of practice” (Wenger, 1998, p.265). In this light, textbook teaching about rainforests does not necessarily cause learning; in fact much of what constitutes learning takes place without teaching, and indeed much teaching takes place without challenging learning. For its topical context alone, the ‘Rainforest’ unit provides a rich heuristic for introducing new (rich) teaching and learning technologies to support critical and ‘productive’ pedagogies.

The school involved was a large public secondary school close to the inner city area of Cairns, Queensland. The class of 33 students (mean age of 15 years) was asked to complete a five-week unit of study on “Rainforests”. The ‘Rainforests’ unit was selected for on-line development because it already featured:

- facilitated peer-to-peer learning activities,
- cross-disciplinary collaborative interactions,
- situated problem-solving and;
- it provided the stimulus for learners to engage with a variety of learning resources, scenarios and climatic models.

A primary aim of the on-line environment was to extend the borders of the classroom to enable learners to have increased access to just-in-time information resources for simulations, group work and problem solving. A second aim was to enable interactions that promote a sense of belonging to a wider and richer learning environment than the immediate classroom. To the extent that teaching and learning are linked in practice, the linkage is not one of ‘cause and effect’ but one of ‘resources and negotiation’. Unlike a classroom where everyone is learning the same thing, participants in an on-line learning community contribute in a variety of inter-dependent ways to the learning of the community and to engaging others through that learning. The value of an on-line pedagogy lies in its capacity to enable teaching and learning about ‘Rainforests’ to interact so that each becomes a structuring resource for the other. For this reason, the ‘Rainforests’ site paid particular attention to encouraging the learner out of the passive, and into an interactive mode of learning. This involved building pedagogical steps between:

- Student Prior Learning (Pre-learning Requirements)
- Learning Outcomes for each module of study (Knowledge Sourcing)
- Frequently Occurring Misunderstandings (Knowledge Sharing)
- Learning Tasks – Awareness Tasks to Promote Real World Issues; Puzzle Tasks to Challenge Existing Learning; Revision Tasks – what Gilbert (1962) termed ‘Backward Chaining’; Problem-solving Tasks, and Reconciliation Tasks as a Means of Integrating Awareness, Puzzles, Prior Learning and Problem-solving.
- Subject Feedback Processes (Knowledge Dissemination)

**Time Zones in a Rainforest**

The first sign that something ‘different’ had happened in the classroom was that the five-week unit was much shorter than anticipated. In fact, the teacher completed it in two weeks, most of the student groups in three, and one group of boys failed to conclude it in five weeks. The class was both divided and together in its on-line experience of learning about
‘Rainforests’. Not only did it separate students/teachers and student/student in ‘learning time and space’, but the on-line medium also pointed out that ‘learning’ time does not align with ‘teaching’ time, and that learner perceptions of both are a powerful influence on learning experience and outcomes.

Learning Design and Architecture

The on-line ‘Rainforest’ environment is heavily constructivist: the aim of its design to stimulate candidate membership by recruiting learners vis-a-vis Wenger’s (1998, p.270) three component design infrastructure of ‘engagement, imagination and alignment’. The learning architecture provided by a learning management system supports Wenger’s (1998) thesis by providing pedagogical applications for:

- Communication suites/tools/places to promote and expand asynchronous engagement.
- Web-mounted materials and experiences (i.e. Virtual Amazon tour) by which learners construct an image of themselves in their world that is ‘issues-based’ rather than ‘timetable’ or teacher-centric.
- Simulations and interactions to ‘practice’ and ‘form practices’ about how to manage ‘Rainforests’, given the diversity of management issues to understand and consider.

The on-line environment presented in Figure 1 offers a variety of features and tools that can enhance the delivery of subject content materials and activities. These include a conferencing system, on-line chat, student progress tracking, group work organisers, student self-evaluation, grade maintenance, access control, navigation tools, auto-marked quizzes, e-mail, course calendar, student homepages, digital drop boxes and embedded search engines.

Figure 1. Rainforests On-line

The choices facing staff moving into an on-line teaching environment are daunting, and the ‘technologies’ broad. Initially, the magnitude of the pedagogical divide confronted teaching staff.

...we used to spend a week on this or a week on that and now they (students) are all over the place...I worry that they don’t spend enough time on the important bits, and I’m buggered if I know how to test them. (Interview Teacher A)

Teachers reported that the traditional teaching pyramid had ‘been inverted’, and felt at the ‘bottom of the technological totem pole’. Despite initial feelings of ‘inadequacy’, by the end of the Rainforest unit classroom relations had significantly reformed as staff and students began to engage with (and transform) the learning resources. A new set of learning relations began to evolve.
We learned a lot… even about Rainforests, but mostly about how to learn. I would like to say we met on a level playing field, but the kids were way ahead of me. But (we) swapped ideas and traded skills and before long I was in about 12 discussion groups, and was able to start pointing and linking these together. The silence in the classroom was deafening…the noise in the discussion boards was huge. …I wondered how these things stop but then remembered we still have the bell thank God. (Interview Teacher A)

Capturing What Students had to Say

When a classroom teacher states that we ‘learned a lot … but mostly about how to learn’, we were intrigued to know more about the nature of this learning, how it is (re)distributed within this particular classroom, and what kind of pedagogical costs or benefits accrue. In keeping with virtual community protocols, an on-line survey featuring 20 items (a CGI form) was generated and posted to the subject web site.

A feature of the Rainforests unit was the host course management (LMS) software, which provided opportunities for embedding and networking collaborative learning groups. Learning group activities conducted over the scheduled five weeks engaged students in collaborative problem solving. On-line meetings consisted of sharing information, dissecting course materials, conducting environmental site analyses, collecting project data, collating project data, interpreting data, as well as publishing results from virtual field-trips and projects (eg: Virtual Amazon). The ‘assessment task’ for the unit involved students designing, developing and testing their own board game simulation that captured the “Balance of the Rainforest” as they understood it. Formative assessment involved a range of progressive on-line quizzes that often directed students to the archived and published work of other students as a point of contest and reference.

The Data: Learning In and Learning Through Technology

The results of the survey (Table 1) indicate that students endorse the on-line environment as a positive forum for learning. Reported learning transfer is high (85%), as is the reported increase in computer and communication tool skills (85%) and applications (88%), and the level of ‘fun’ experienced (91%). Clearly, participation in the learning activities of the ‘Rainforests’ unit requires negotiation of learning resources. Table 1 indicates a high level of acceptance of and for self-directed learning (82%), and self- (82%) as well as time-management (76%) opportunities. The Learning Management System records times that participants log in to the system and these data demonstrated that 90 per cent of the survey cohort accessed the learning resources outside of schedule class-time, indicating a readiness to extend (and in some ways challenge) the limitations of the ‘timetabled classroom’. This finding provides strong evidence of engagement with, and acceptance of a new learning context, one that transcends learning beyond the pedagogical intentions of the school setting.

A climate of active learning exchange (73%) was evident between students and the embedded learning resources. These resources in turn promoted opportunities for learning to learn through both global and local materials and activities (77%), for the modelling of learning behaviours (85%), self-reflection and feedback (54%). Students reported a sense of involvement in realistic challenges that mediated their study of the environment, their interactions with peer group members, and the available ICT resources. Learning was not just confined to learning about technology, but encompassed learning in, and learning through technology. Feedback on aspects of member participation indicate an increased awareness of how ‘my behaviour affected others’ (73%), of the need to manage group processes (67%) and how to include and accommodate others (73%) in collaborative learning tasks. The online environment was clearly able to stimulate ‘authentic’ experiential and interpersonal challenges for students in a year eight SOSE course of study.
The ‘identities of participation’ that emerge through these classroom interactions point to a learning community that is closely connected by knowledge resources, whose membership is locally differentiated (by skill, exposure, preferences, proximity) yet remains locally connected through learning. In terms of induction to on-line learning, students labelled on-line modes of engagement as somewhat ‘unorthodox’ (52%) at first. Understandably, given the shift in the fundamental relations of the classroom, nearly half the students declared that they initially felt ‘at risk’ (45%) in this unfamiliar on-line environment.

Table 1. Summary Statistics – Student perspectives of On-line learning

<table>
<thead>
<tr>
<th>Individual perspective</th>
<th>Agree</th>
<th>Disagree</th>
<th>Unsure/DK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved my computer skills</td>
<td>28 [85]</td>
<td>0 [0]</td>
<td>5 [15]</td>
</tr>
<tr>
<td>Felt at risk at first</td>
<td>15 [45]</td>
<td>7 [21]</td>
<td>11 [34]</td>
</tr>
<tr>
<td>Learned a lot through the experiential exercises</td>
<td>28 [85]</td>
<td>0 [0]</td>
<td>5 [15]</td>
</tr>
<tr>
<td>Learnt to have confidence in other students</td>
<td>24 [73]</td>
<td>4 [12]</td>
<td>5 [15]</td>
</tr>
<tr>
<td>I took control of my own learning</td>
<td>27 [82]</td>
<td>3 [9]</td>
<td>3 [9]</td>
</tr>
<tr>
<td>I was able to relate materials to real world issues</td>
<td>25 [77]</td>
<td>5 [15]</td>
<td>3 [9]</td>
</tr>
<tr>
<td>I felt comfortable giving/receiving feedback</td>
<td>18 [54]</td>
<td>9 [28]</td>
<td>6 [18]</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Group perspective</th>
<th></th>
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<tbody>
<tr>
<td>Saw how my behaviour affects others</td>
<td>24 [73]</td>
<td>3 [9]</td>
<td>6 [18]</td>
</tr>
<tr>
<td>Learnt to include quiet people</td>
<td>24 [73]</td>
<td>3 [9]</td>
<td>6 [18]</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>The Rainforests Project</th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Learnt to manage others in group work</td>
<td>22 [67]</td>
<td>8 [24]</td>
<td>3 [9]</td>
</tr>
<tr>
<td>Forced me to manage my time</td>
<td>25 [76]</td>
<td>4 [12]</td>
<td>4 [12]</td>
</tr>
</tbody>
</table>

The feedback from students about their ‘maiden’ experience of on-line learning is glowing, and assigns a significant role to resource-based learning in the SOSE classroom of the future. GroupWare enabled easy transition between private and public spaces, shifting the learning focus from the macro (class) level to the micro (learning group) level. E-mail provided a conduit for one-on-one networking for the sharing of information with limited clusters of learners, and ‘back channel’ group discussion pages helped orchestrate the public space before students ‘went’ public with their work and/or ideas. As their study of Rainforests progressed, students settled into a pattern of web-site use built around the site functionalities. The mix of idea-sharing forums and tool-building projects fostered both casual classroom connections as well as facilitated learning outcomes. The combination of whole class, as well as small learner group gatherings created a balance between the comfort of teacher-centred interactions and the ‘self-management’ and ‘self-pacing’ students describe when working in a distributed learning environment.
The Teacher’s View – Teaching Rainforests On-line

As educators we are traditionally encouraged to focus on creating structures, systems and roles within our classrooms that achieve relatively fixed (sometimes banded, sometimes hierarchical) goals that enable our students to fit well into other school-based or systemic structures and processes. To most teachers this challenge presents itself in the form of strategies and techniques for classroom management. Rainforests on-line brings to a focus the challenges facing teachers and students when interfacing between two ‘delivery’ and ‘classroom’ management contexts. Teachers in this study report a range of challenges in a variety of areas: technology, logistics, organisation and delivery (Dabbagh, 2001). What emerged from teacher observations was a sense of dissonance, a fragmentation of teaching practice across two conflicting platforms.

Two roles … on the one hand me, the constructivist, the facilitator moving in and around the knowledge construction processes of the student. They expect me to be their peer, their mentor … I am supposed to contribute equally to the subjective and unstructured as well as the structured discussion within the class. On the other hand a different me … the assignment marker … bringing the lower end of the class closer to the top end … the expert who will ultimately be expected to pass judgment on the rigor of student work in the most objective way possible. This conflict means the roles have to be performed independently – this results in a huge increase in my workload. (Interview Teacher A)

After analysing the ‘activity’ (read on-line chat) within the subject discussion board, over half the discussion threads were generated by the teacher, and more than 50 per cent of the total responses were directly attributable to the teacher. Most of the teacher’s discussion threads were attempts to ‘set the collaborative agenda’ for the class, including setting up activities, assigning groups and indicating useful resources. As the Rainforests unit progressed, more and more of the teacher’s on-line time was spent on ‘weaving’ the student discussions towards an outcome. In the words of the staff member involved, this was ‘heavy reflective work’, the ‘essence’ of good teaching.

One task had students using email to prepare and submit a summary report of their board game … (you know) the final assessment piece for the unit. This created huge response pressures. Even the suggestion of ‘email contact’ raises the expectation that I am permanently on tap for feedback, and that feedback will be needed yesterday rather than today. Great! … so one Monday I lose my spare period when I would normally send out emails and for the rest of the week I am apologising to kids for my tardiness. They got very clever … “Hey Mr, I can’t do this assignment until you have approved my concept”. The system had turned on me … it was (like) trial by media … make that multi-media (hah).

And then … yes there is a then … you (interviewer) told me to use the technology to work for me, you remember … to copy and paste responses in email rather than type it all. So the kids start to compare my feedback comments … and what do you know … they accuse me of sending out the same rotten email. I have never felt more under the microscope. (Interview Teacher A)

The conflict between face-to-face and on-line processes was marked. In the words of the teacher, “its bread and butter practice to close a lesson by pulling together the key themes of a lesson”. The demands of new literacies and their synchronous and asynchronous properties shift the responsibility for mediating discussions (read directing learning) to the facilitator. As the same teacher concludes, “closing an on-line discussion helped me to demonstrate effective modelling and synthesising strategies, but it took me far too long (time) to achieve this”.

The organisational and logistical aspects of on-line learning seemed also to challenge both the response capacity as well as the administrative ‘mind-set’ of the school. It was difficult to “get a computer lab”, and even more difficult to “break into the IT and multi-media tribes” to secure server access and “some form of ongoing help”. Assessment also appeared problematic in an on-line environment. The teacher felt compelled to be able to ‘feedback’
to students and parents about the quality of each student’s participation, but felt he lacked the ‘repertoire’ (read time and means) to determine;

which student contributions actually enhanced on-line debates; who was original and who was responsive in discussions; how to deal with lurkers and non-participation, and how to educate about attribution of ideas and resources. In short … I felt the collective was engaged seriously in learning but I found it hard to say the same for each individual. How do you report this to parents? (Interview Teacher A)

As to the degree to which technology added value to the classroom practices of this particular teacher, we must borrow on the experiences of ‘Tina’ as a measure.

Tina _______ just talks a lot. She is incessant. In class I would speak to her all day everyday if she had her way. I added up all the words I had typed to her over the last four weeks … about 1800 words. Stay with me … I have a point. Now, if I speak at … say 160 to 170 words a minute this means that in four weeks I have spoken to Tina for the equivalent of about 10 -12 minutes. You tell me … is that enough? (Interview Teacher A)

The risk in over-focusing on the experiences of one on-line teacher is that we may tend to over-identify with a very singular and idiosyncratic episode of teaching, vis-a-vis a sample of one. On-line teaching is a transformative practice, and just as we change one variable in our teaching regime so must we come to reflect on the applicability of all aspects of our teaching. The fact remains that on-line teaching has lead this teacher to question a dual delivery model. Despite the glowing response from students about their short experience of ICT and resource-based learning, two enduring principles emerge for our more circumspect teacher.

- On-line teaching leads to an increase in teacher workload, and;
- It can also lead to dissatisfaction (or at least ambiguity) with the quality of the teaching experience.

Example Two: Teacher Professional Development Support

Twelve teachers from three separate inner city, public primary schools in Cairns, Queensland engaged in hands-on workshops involving software programs commonly used in public schools across all curriculum areas. The software programs were those included in the Microsoft Office suite including Microsoft FrontPage. Teachers engaged in this professional development trial also identified Hyperstudio and Inspiration as programs that they would like to use more frequently in their classrooms. Each school involved in the professional development belongs to a formal alliance of schools known as the ‘Cairns Consortium of Schools’, which constitutes a formal agreement between the schools to share resources and collaborate on important issues such as teacher professional development.

Holland (2001, p.2) argues that although skill based training of teachers in ICT is important “current best practices suggest that while staff development may begin with such training, it should move quickly beyond to efforts that support teachers’ development as professionals involved in decision-making, inquiry, and leadership in classroom teaching”. To this end, meetings were held with the Consortium coordinator, the teachers and staff from James Cook University to examine the features of a Learning Management System and to decide how the online environment could support the teachers’ needs in furthering their knowledge of ICT with a view to effective classroom implementation. Orientation sessions with the LMS were considered by all participants to be an essential starting point to these decisions, a point confirmed by McVay-Lynch (2001) who concludes that orientation sessions have a significant positive impact on the successful use of online learning environments. Teachers participated in development sessions at the university that involved guided exploration of the initial professional development site. This site consisted of links to exemplary JCU
subject websites (with guest access enabled) and a link to ‘Webucation’ – an on-line professional development module that features problem-based learning as a catalyst to designing, developing and publishing on-line learning resources.

After these orientation sessions and hands-on experience using the LMS, the participating teachers identified important priorities for a staff development site. These included:

- Online self-paced modules for skill development in selected software packages that could be completed by teachers or students.
- Modules or links to information on learning theory associated with the successful use of ICT in classrooms.
- Examples of best practice from classrooms, including written accounts and files showing exemplary student work.
- Support for synchronous and asynchronous collaboration between participating teachers and students; and:
- Links to useful sites such as Education Queensland policy and curriculum documents on computers in classrooms.

Teachers regard a potential staff development site as a way of bringing together theory and practice – to create a link between professional development providers and real classroom situations, as well as enabling a greater degree of on-going dialogue, reflection and sharing between participants. The importance of online tools extending the time and place that interactions can occur has been emphasised by Barab, Thomas and Merrill (2001, p.3) who maintain that “a central conviction underlying our perspective is that learning is a social act best supported through collaborative interplay among human beings – an interplay that can be effectively supported through the use of these tools”. The teachers in this case study agree, and emphasise the value they place on extending interactions that are often begun in face-to-face professional development workshops, only to be lost on return to the classroom. Currently, skill based modules for software programs identified by the teachers as important are under trial by the participants. Links to useful sites are being collated and informed by members of the consortium, and processes for identifying and displaying best practice are being refined. Tools for collaboration between the participants have been made available and teachers are experimenting with chat and threaded discussion boards.

Concerns expressed by consortium members reflect the comments of teachers involved in the pilot ‘Rainforests’ project, and the broader literature. There remains a perception that on-line learning environments are inherently disembodied in nature and lack an intuitive instructional quality (Peitenati, Giuli & Khaled, 2001); that there is often not enough synchronous communication (Wang & Newlin, 2001); that teachers and students often lack the experience with ICT to effectively use the embedded tools and features (Cooper, 2001), and that viruses are easily (and painfully) transmitted (Wilson, 2001). The positive nature of participant response in this study indicates that these problems need not be features of online learning environments, and that strategies can be found to ensure that online professional development can be a solution oriented catalyst for ongoing pedagogical change.

CONCLUSION – STRIKING A BALANCE

Although this study has limitations in that it involves a small, specific sample, it illustrates that on-line teaching and learning environments (LMS in this case) provide a context in which teaching practitioners can design a curriculum that can motivate students and help them towards personal and cognitive growth. However, this transformation will not happen if left to chance. Some training in the technology is necessary if teachers are to take
advantage of the vast and still expanding range of cyber resources. Institutional investment in computer hardware and software will not yield excellence in teaching without similar input into the funding of staff development in the necessary pedagogical skills. Herein lies the potential for collaborative efforts between schools and universities to further improve pre-teacher training and professional development opportunities to include ICT in teaching. Stenhouse (1975) reminds us that there can be no curriculum development without the development of teachers. Holland (2001, p.245) points to this momentum as the crest of the wave, arguing that “as technology changes the way that schools themselves are structured, efforts to meld innovation in instructional technology with best practice in teachers’ professional development catalyses other elements of school reform”.

Professional competence is therefore at the heart of the future for on-line teaching. Simply insisting that teachers develop ‘rich tasks’ with technological overtones will not of itself result in sound educational practice in an on-line environment. Teachers must also be able to reflect on practice, inside and outside the LMS if their students are to enjoy the benefits of emerging technologies. It may mean that the teacher (as per our teacher in example one) has to think deeply about both face-to-face and on-line practice as a dual delivery package. In many ways, this is the same level of demand we placed on the students and teachers who participated in this study, and on students who participate in on-line learning on a daily basis. In the first example cited, teachers and students recant transformative change in the learning culture of their classroom. In the second example, teachers reflect on the benefits and opportunities that emerge from staff development activities that draw on a dual mode of face-to-face and ICT enhanced delivery. Data presented from each of the projects described in this paper confirm that the transition to on-line teaching requires more than the development of new technical skills. As online learning moves from the domain of distance education to encompass all modes of educational delivery, future research needs to be targeted towards a thorough examination of teacher readiness and the effectiveness of teacher professional development.

REFERENCES


