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Chapter 5

Technology Enhanced Distance Learning Utilising Sakai CLE and Adobe Connect Pro

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ABSTRACT

On-line environments have been incorporated in the Distance learning programmes of the International Equine Institute (IEI) in order to address concerns about streamlining assessment turn-around, distance student attendance at tutorials, providing more detailed and quicker assignment feedback, student peer interaction, student to tutor¹ interaction and, of course, student support. The overriding concern was to provide a more flexible, active learning environment to develop and enhance learning opportunities while, concurrently, integrating more closely the learning activities of the student with the University of Limerick (UL) community. The impetus, therefore, was to make studies convenient and attractive to the location of the distance student, while maintaining educational quality through the provision of pedagogical innovations and at the same time providing a social and interactive environment to support the distance student. In so doing, the IEI uses the collaborative learning environment (CLE) Sakai (www.Sakaiproject.org) to support the distance student and also utilises Adobe Connect Pro™ to deliver on-line synchronous desktop-to-desktop tutorials. This chapter outlines aspects drawn from our experiences with the on-line support and delivery of distance learning programmes. Throughout, various recommendations on enhancing the experiences for students are also presented.

INTRODUCTION

The use of on-line technologies² has changed contemporary education in ways that were not imaginable in the past. The impact on higher education,

and most especially distance learning, has become significant (Kingsley et al., 2009; Spector, 2001). According to Bennett et al., (2004) “Advancements in on-line technologies have facilitated a convergence of distance and campus-based learning”. This phenomenon has progressed (Bennett et al.,

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2004) to such an extent that programmes offering courses through distance learning have begun involving a mix of reduced face-to-face classes and greater on-line interaction (Lockyer et al., 2006), including on-line access to course materials, on-line virtual tutorials, and collaborative learning environments (CLE), to mention just a few of the many flexible on-line technologies currently available (Concannon et al., 2005).

Universities are also now required to cater to the lifelong learning market by offering greater flexibility in learning opportunities (Robins et al., 1999) as cited in (Eynon, 2008). As a result, flexible on-line learning technologies are becoming widely used in a response to the differing needs of students. Effective integration of these technologies into higher education is becoming an essential proficiency for tutors (Ala-Mutka et al., 2009), especially for those involved in distance learning. Expertise in the use of the technology and competencies in the various learning elements and pedagogy, and a range of social interaction skills, have become necessary to effectively implement and, subsequently, integrate the technology enhanced learning (TEL) into the design of curricula.

The IEI, established in 1993, is part of the Department of Life Sciences in the Faculty of Science and Engineering at the University of Limerick, Ireland. The IEI coordinates the distance learning delivery of Honours Certificate and Diploma in Science (Equine Science) programmes. For further information, see the edited transcription of questions and answers (2009) administered by the IEI to tutors on its programmes (Appendix 1).

Objectives

The objectives of this chapter are to:

- Discuss the background to the integration of on-line technologies into the IEI programmes

- Evaluate the integration of on-line technologies into the programmes in the context of more traditional learning opportunities and through this, discuss issues, problems and controversies encountered by the IEI
- Discuss solutions and recommendations established by the IEI through their experiences of using on-line technologies on the distance learning programmes

Background

The concept of lifelong learning has created a greater focus on the provision of open and flexible learning opportunities developed to accommodate the very many people who were unable to commit themselves to full-time education. The Open University, UK enrolled its first students in 1971 and Oscail, based at Dublin City University, begun enrolling distance learning students in 1982. Other institutions across the world, some for many years prior to the 70's and 80's, were also in the business of offering open and distance learning programmes. Increasing numbers of students were looking to access education and training opportunities through use of on-line technologies. Eynon (2008) confirms this logic in universities outside of Ireland. As a result of these initiatives, and based on recognition of a growing demand from potential students and current faculty for wider and more flexible access to programmes, the University of Limerick commissioned a collaborative learning environment (CLE), called Sulis which is based on the SAKAI CLE framework. This CLE reflects the "dual mode package" concept advocated by Eynon, (2008) which caters to students both on and off campus. The Equine Science distance learning initiative, at the University of Limerick, relied on TopClass CLE technology to support delivery of its programmes, until the adoption of the newly commissioned Sulis CLE in 2007.

The need for the utilisation of on-line technologies on the Equine Science distance learning pro-

programmes derived, primarily, from the profile of the IEI student population, the facilitation of student accessibility and flexibility in a ‘blended-learning’ delivery (Saunders et al., 2003), the supplementation of face-to-face and on-line tutorials, and a range of other opportunities, such as the promotion of collaborative learning, on line assessment and greatly reduced costs to the participating students of undertaking studies of a validated programme. The on-line virtual environments of the IEI programmes addressed concerns about student support by facilitating staff–student and student–student interaction, streamlining assessment turn-around, and providing more detailed assessment feedback. In addition, the IEI was acutely aware of the negative feelings resulting from a sense of isolation that a distance-learning student can experience (Buckley et al., 2007). The overarching goal of the adoption of the distance learning paradigm was to provide a more flexible, user-friendly, active learning environment incorporating social, technical and pedagogical solutions. The on-line technologies were additionally developed to enhance learning opportunities, thus “redressing some of the inevitable imbalance” (Dorrian et al., 2009), between students who are able to attend a university campus, and those with life circumstances that make travelling to the physical campus not feasible.

The typical profile of the distance-learning student of the IEI is mature³ and “part-time”. While some students take the course immediately after completing secondary education, a large number of students are already experienced career holders. Students may already be in full-time employment, be on short career breaks and/or have prior family commitments and, therefore, have very little time for attending face-to-face tutorials that could involve travelling distances. Therefore, it was necessary that students be provided with support regardless of their personal circumstances or location in the country. In addition, adoption of

the ‘new on-line technologies’ enabled the IEI to keep pace with other providers of distance learning programmes. Private for-profit higher education institutions are offering through distance learning mode, a wide range of undergraduate and post-graduate programmes.

From a learning perspective, the use of on-line technologies have also facilitated the ability to directly transfer knowledge from the tutor to the student, encouraging collaborative and self directed learning in a manner that allows students to “process the information so that it becomes personally meaningful to them” (Atkins et al., 2007). This has, therefore, placed pressure on the traditional forms of higher education (Concannon et al., 2005) by offering innovations in the support and delivery of academic material through on-line environments where the design of such environments are interactive, peer-generated and collaborative, and move beyond standard pedagogy and theories of learning. Some observers would agree that such environments can be used to powerfully augment more traditional learning modes and materials (Atkins et al., 2007; Dorrian et al., 2009).

On-line technologies have provided a whole new mechanism for overcoming distance; for accessing information from the convenience of one’s home or workplace; for pursuing the accredited learning programmes of institutions such as the IEI, and for interaction with other learners in a virtual environment. On-line technologies can improve the quality of the educational experience by providing rich, exciting and motivating environments for learning (NSF, 2008), and can accelerate positive trends such as increased emphasis on information handling and problem-solving and reduced emphasis on memorising facts (Science, 2000), while encouraging the development of creativity, imagination and self-expression for both students and tutors.

Delivery and Support

Using Sulis (SAKAI)

The CLE, Sulis, (Figure 1) utilised by the IEI, is one of the key ICT mechanisms that facilitates the delivery support of the IEI's suite of distance learning programmes. This is built around the framework and the code produced by the SAKAI open source community. The University of Limerick has adopted the title 'Sulis' for its SAKAI CLE platform (<http://sulis.ul.ie>). The programme of study is divided into courses (modules) calculated to generate a quantum of learning equivalent to approximately 120 hours each. Each module is supported with a customised hard copy learning pack and on-line support material made available over the CLE. The latter support comprises additional information, readings, web and DVD links, on-line library searching, explanations, clarifications and, in some cases, module-specific software, as appropriate to the particular module. In addition, operational information such as schedules of tutorials, information on field visits and on-line discussion opportunities are also provided. Students are enabled to interact with each other, with tutors and with the IEI, and conversely, the IEI and tutors with students. Students can submit their assignments on-line and/or undertake on-line assessments; in both cases students are provided with on-line feedback. In effect, the IEI adopts the view that the CLE, Sulis, operates as the 'virtual classroom'.

The CLE is managed by the IT Division at the University, but customised by the IEI. The IT division, while dictated by the design of SAKAI, moderates the level and range of interactivity possible with the CLE, and this control is evident when navigation and appearance are considered. Each module moderator, in collaboration with the IEI, then populates the content of the CLE to satisfy the needs of their students and/or their curricular and course goals (Atkins et al., 2007). From a pedagogical perspective these sites and

tools need to be well designed, relevant to their needs and appropriately embedded into the culture of the course (Conole et al., 2007) to effectively engage with the students' learning processes.

Students are introduced to the use of on-line searching and availability of resources from the outset of the programme and this training, undertaken at the first tutorial (face-to-face), becomes an integral part of their familiarisation with Sulis. This is critical to providing students with some of the tools essential to satisfactorily exploit the research-based, collaborative learning approach promoted throughout the programme modules.

Using Adobe Connect Pro

The IEI utilises Adobe Connect Pro™ for the delivery of on-line synchronous desktop-to-desktop tutorials. Adobe Acrobat Connect Professional (formerly Macromedia Breeze) is software used to create information and general presentations, on-line training materials, web conferencing, learning modules, and user desktop sharing in a "live classroom" communication environment. IEI student users of Adobe Connect Pro require access to a computer with broadband, a headset (or earphones) and a web camera. Adobe Connect Pro has an intuitive, attractive interface. It runs on the ubiquitous Flash Player across the Internet, and therefore, students and tutors are not required to download any additional software. All virtual meeting rooms have interfaces that are very intuitive and are organized into 'pods'; with each pod performing a specific role.

Some of the features include:

- Virtual meeting rooms
- Audio and visual interaction
- Share pod for presentations, video clips, sound files, and documents
- Polling and testing
- Chatting
- Hands-on labs
- Breakout sessions

Figure 1. Basic outline of a Sulis page (Powered by Sakai)



- Recording sessions
- Interactive Whiteboard use

The IEI, after initially piloting Adobe Connect Pro with a group of more experienced Equine Science Diploma distance-learning students, has now adopted it as the on-line mode of delivery for all its modules. The IEI follows the procedure of creating an on-line virtual meeting room on Adobe Connect Pro. Remote students are provided (by email) with an Internet link to the live classroom session, where they enter their name. Once in the virtual room, all members can broadcast live synchronous audio and video material. As long as the students have access to broadband, they can use their own home or an alternative preferred location. Tutors have the option of recording their tutorials and posting these recorded links to the Sulis CLE for access by students at a later date.

Once entered into the room, the students are able to (Figure 2):

- See the tutor and other class members through a web camera
- Communicate with the tutor, and other students through voice protocols or chat rooms

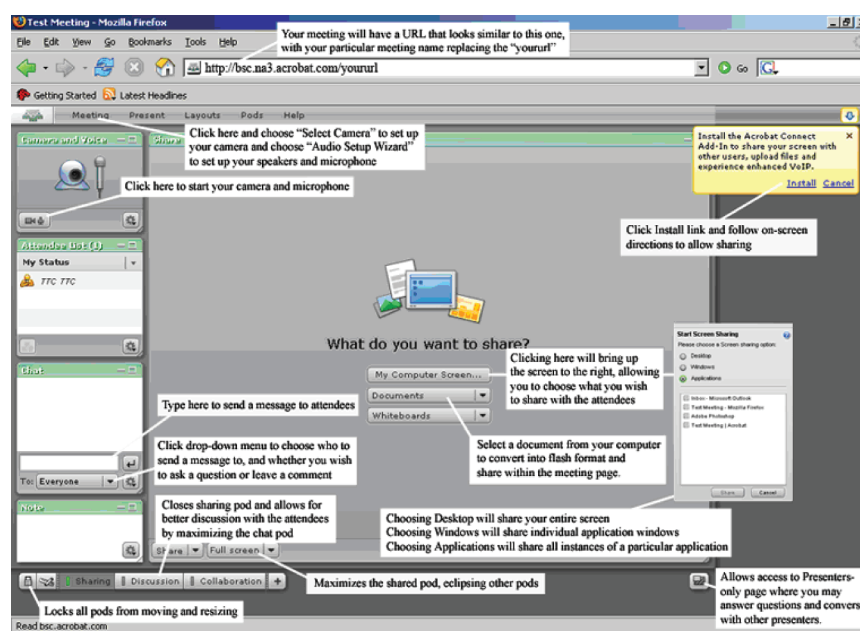
- See the contents of the interactive Whiteboard, PowerPoint presentation or additional file formats in use
- Revisit recorded key lectures and elements of key topics, thus creating a bank of resources
- View pre-recorded practical tasks and procedures for later use.

Technology Enhanced Learning (TEL)

Issues, Controversies and Problems

It is generally accepted that any influence of technology will vary as a result of a range of complex and interrelating factors (Eynon, 2008). Implementing a virtual learning environment is not without pedagogic, technological and social impact (Lyons, 2009) on both the student and the tutor. The lack of uptake of technology for educational programmes can be due to a complex mix of inter-related factors including the contrast between a traditional and student-centred approaches to teaching, faculty resistance to change and lack of the necessary digital literacy skills, the fixed and static nature of curriculum and assessment prac-

Figure 2. Basic outline of Adobe Connect Pro meeting room



tices, and infrastructural factors such as teacher workload and lack of time (Conol, et al., 2008).

Pedagogical

With the rapid development of emerging technologies, the integration of on-line technologies has increasingly attracted the attention of educators (Wang, 2008). What is necessary to consider is that the use of on-line technologies is contingent on not just underpinning traditional methods of teaching and learning but the innovative and interactive use of these technologies to enhance a students academic experience and increase pedagogical quality (Devine, 2005). Eynon, (2008) stated that it is necessary to be concerned about the use of technology for technology's sake and the importance of using the web appropriately (Eynon, 2008). In fact, the argument exists that TEL is not about the technology itself but about the appropriation of technological tools to achieve results (Ala-Mutka et al., 2009; Eynon, 2008).

Careful introduction of on-line techniques into distance learning is therefore necessary, as it may represent a substantive change in learning

style for students and for pedagogy on the part of the tutor. Academic module designers need to plan thoughtfully before beginning any on-line technology integration into a module. Learning objectives and contexts need to be identified and the correct CLE tools incorporated. Existing materials and resources may need to be modified or developed for the virtual environment to engage students. While it has been found that equine science students can adjust to web-based learning, the most important predictor of student satisfaction is excellence in pedagogy, irrespective of technology (Dorrian et al., 2009), and in order to achieve this, tutors utilising on-line technologies need to have the appropriate skills. In this context, there is agreement for the need of improved tutor development opportunities focussed on the academic as a skilled pedagogical designer, virtual environment facilitator and academic educator (Devine, 2005; Wang, 2008).

Technological

While there is a tendency for Irish universities (Concannon et al., 2005) to utilise the benefits

of on-line learning technologies as a mechanism to facilitate and improve learning quality and performance in students both on and off-campus, the self-directed learning techniques such as those typically employed in on-line distance learning are not always met with enthusiasm from both students and tutors (Dorrian et al., 2009). In fact, utilising technologies can often cause anxiety in students and also those tutors who are unfamiliar with on-line environments. This can have a snow-ball effect in relation to the degree to which tutors encourage and direct students to relevant support sources. Depending on individual departments and tutors, some provide links to recommended sites and CLE tools and resources, while others do not. These findings reflect similar positions reported at the IEI.

The age ranges, educational experiences and academic profiles of the cohorts of the Equine Science distance-learning students are quite disparate. In general, they tend to be older and have been out of formal education for many years. Most would not have previously undertaken any formal third level programme of study. Students belonging to this type of profile are more comfortable with the more traditional face-to-face didactic style of education. Technology is not necessarily a ubiquitous part of their daily environment. Not all students would have an easy access to the Internet nor would the students have the same abilities using on-line technologies. From an educational and, especially, a technology perspective, students may be somewhat uncomfortable with discussing a situation or a topic while not knowing ahead of time what they need to know to succeed. In that sense, they expect to discover or uncover knowledge as they explore a domain, be that a CLE or a book. Many are unfamiliar with the rapid multitasking and accumulation of data that the typical, on-campus student takes for granted; they expect to be told by an authority to read a particular selection of books or manuals and may not have developed the digital or collaborative

skills required for utilising on-line technologies prior to enrolling in the IEI programmes.

Social

A further significant issue encountered is the inevitable reduction in person-to-person contact when on-line technologies are used; students, especially distance-learning students, currently demand more contact, not less, and a lack of contact is believed to negatively effect students' motivation to learn (Eynon, 2008). Both the student and the tutor have expressed that they miss the face-to-face interaction and the body language that is an integral aspect of such teaching. In fact, in many cases the interpersonal skills of the tutor are almost of as much importance as the reliability and intuitiveness of the pedagogy and technology utilised.

Solutions and Recommendations

Pedagogical

It is important that students are not only comfortable with on-line technologies, but also it is imperative that tutors do not find the change in delivery method to be a barrier to effective teaching. Tutors need to be motivated and prepared to take advantage of the potential opportunities available through the use of on-line technologies. According to Devine (2005), on-line technologies have great potential for radical innovation afforded to distance learning when deployed within a well-developed and robust technical and pedagogical infrastructure (Devine, 2005). Therefore, appropriate selection of interactive tools that are incorporated into the on-line technologies will act as a bridge between good pedagogic practice and effective use of new technologies (Conole et al., 2008). In addition, the interface design of on-line technology support must be attractive so that it can motivate and engage learners (Wang, 2008). Thus it was (and still is) believed that the interface of each module should comprise fewer words, more

graphics and much more dynamism or interactivity in a highly structured, more resource-based style of pedagogy when authoring courses for the web (McAndrew et al., 2009).

As a result, IEI tutors are encouraged to adapt the base set of programme materials and resources as suits their individual needs and teaching styles. The lesson plans, materials, resources are stored and organised on-line as required; through username/password authentication the tutors can upload, as well as access, the materials. Students get access to the materials and resources through a similar username/password authentication. In addition, the on-line storage and access of materials and resources, including recorded tutorials, has enabled the creation of a much more coherent and consistent set of programmes.

It is, therefore, most desirable that the pedagogy of on-line tutorials be incorporated into any training sessions relating to the use of on-line technologies. To encourage the use of on-line technologies, tutors, as part of a pedagogy seminar organised by the IEI in conjunction with the Centre for Teaching and Learning at the University of Limerick developed learning activities incorporating on-line technology tools based on the premise that tools were taught to the tutors on a need to know basis to enhance the pedagogical aspects of their modules. Tutors were shown that the technology becomes the link between them and their students.

This seminar had the effect of:

- Creating a much more consistent approach to the development of pedagogical schemes. This arose from bringing all the tutors together, and through discussion, the development of greater communication and the sharing of experiences on learning activities across all modules offered by the IEI.
- Creating a greater engagement of all tutors with the adoption and use of technology; the seminar was timely and enabling in

that it coincided with and promoted a more seamless move from the face-to-face tutoring to the use of on-line 'live classroom' technology

- Reducing tutor resistance to the on-line technologies; its uses and potential values were gradually unveiled to them and they became an integral part of the adoption process. Discussion forums are important instructional strategies that have numerous advantages such as promoting critical thinking and knowledge construction and improving relationships (Wang, 2008). These were incorporated as an activity to promote collaborative learning opportunities among the tutors.

Students have now reported satisfaction with the ease of access to the on-line module-specific information and material or pedagogical sources of such material dedicated to their studies. Students felt that this has greatly facilitated advance preparation for on-line tutorials, quizzes, examinations and laboratory sessions. Students have experienced the flexibility of utilising the on-line technologies and can access materials and resources from home and workplace, and can revisit these at any time. In addition, this allows students to manage their time more effectively and encourages self-learning. They can catch up on any missed tutorials or discuss any problems without using the phone or travelling to the University of Limerick campus.

Technological

The IEI staff realised early on in its on-line technologies development that when selected tools of the CLE were mandated for use, improvements in students' applications to learning were evident. To assist with the use of these tools, the IEI provided students with specially designed TEL Handbooks offering suggestions on how to study, clarifying the learning objectives, and providing information on how to use the technology as a support

tool for the wider task of preparing for the module. The IEI also offered on-demand technical support, assistance and training with aspects of the technology to enable the students to become familiar with and comfortable in the competent use of software and the tools.

When incorporating on-line technologies into the distance learning programmes, the IEI took into account that learners have different approaches to learning. The on-line technologies encourage the students to take responsibility for their own learning and provide them with the choice of when/how they learn. This method instills a responsibility for their learning by maximising their control over its content and delivery (Dorrian et al., 2009). These principles are enabled through a commitment to flexible delivery, providing students with a range of learning resources. In practice, this is achieved through the support of the IEI, which encourages faculty to use a combination of more traditional forms of information transfer and communication (e.g. printed materials, face-to-face lectures, and tutorials and workshops), and innovative methods (e.g. websites, interactive lesson plans, on-line discussion forums, and desktop-to-desktop tutorials). The IEI has also realised that ease of learning is critical for beginners while ease of use becomes more important as users gain experience over time.

Encouraging all tutors to engage with the on-line technologies can be a difficult task for many reasons, but in particular for those who are not comfortable with its use. The response to new learning technology also depends on the effectiveness of the staff development model within the University. An additional barrier to effective delivery of these on-line techniques is the maintenance of excellence in pedagogy, irrespective of the technology used. As mentioned earlier, technical support for the Sulis CLE, on a University campus-wide scale, is provided by the IT Division; however it is the Centre for Teaching and Learning that plays the major role in servicing the pedagogical and training needs of the tutors. This support and training for tutors aids in al-

leviating feelings of resistance to the technology that might be experienced. These latter needs are serviced through drop-in sessions for students and tutors, seminars, on-demand training, on-line support courses and much more. Encouragement is given through positive reinforcement and changing the way faculty think and respond to the CLE; this has the impact of enabling tutors to further improve their courses by enhancing the quality of the pedagogy used and the support mechanisms employed through the on-line technologies. This creates a positive perspective for the use of CLEs in the University where flexibility and good pedagogical approaches are central to both the student and tutor educational experiences.

Social

The technological component becomes more critical in a technology-enhanced learning environment, where many learning activities are conducted through the support of a computer. On-line learning is often undertaken by the students in their home or place of work in physical isolation from others studying the same material. It is, therefore, necessary that the on-line technologies create and maintain a friendly, interactive environment in which participants feel safe and comfortable enough to interact with one another (Anderson, 2004; White, 2004); it must be available all the time and access must be convenient and fast. The consistency of presentation format for the materials and resources in each module provides familiarity for the students, and makes it easier for them to navigate and access the relevant learning material and develop collaborative and communication skills.

However, despite the general consensus amongst the students that on-line course materials 'were a good thing', the importance of face-to-face contact with tutors was still considered necessary and important. The students interviewed described the benefit of meeting with class colleagues and tutors to discuss work issues. Face-to-face contact was considered vital in building a sense of

community or ‘belonging’ to the class and Equine Science programmes. For many, on-line environments were not a substitute for face-to-face meetings with tutors. To assist with this, the IEI holds the first tutorial of the semester as a face-to-face one, where students can interact with fellow students, engage in essential social networking and gain the training required for additional use of the on-line technologies, and learning skills. Subsequent tutorials are then conducted using Adobe Connect Pro. The use of Adobe Connect Pro has the potential to enhance the pedagogical aspects of the tutorials while assisting in the social interaction preferred by students and tutors alike. Once new users get over the initial shyness of using this technology, their confidence soon grows. Adobe Connect Pro permits the development of a collaborative and communication environment and, in addition, it offers great advantages in areas of communication and savings in terms of time, travel, and interactive learning techniques.

Discussion

Utilising Sakai and Adobe Connect Pro has the potential to impact on learning processes by fostering new ways of collaborating, in particular by:

- Building on distributed knowledge
- Developing interactive pedagogy
- Enabling peer group learning
- Providing a framework for professional and academic interaction
- Supporting a centralised model of TEL that a larger group of learners can access
- Giving rise to learning communities
- Creating innovative collaborative dynamics
- Allowing learners to generate new learning contexts where reflective learning transforms the very process of learning.

It should be noted, however, that it is the underlying pedagogic design that facilitates this change rather than the technology itself.

The most prevalent theme arising from the pedagogy seminars and workshops conducted with the tutors was the importance of a reward structure that encouraged students to make greater use of and to rely on the on-line resources, without punishing them if they chose not to use them. It was emphasised that students would only fully engage with the on-line technologies when it contributed to achieving an academic grade. In some cases, marks were assigned for involvement in discussion boards that promoted collaborative learning. This is not a new phenomenon. Con-cannon et al., (2005) also encountered a similar situation and stated, that without adequate reward structures, students were unlikely to access the on-line resources or tasks, despite recognising that they would assist their preparation for the final exam at the end of the semester.

Additional comments from the tutors’ seminars included reference to lack of time, lack of interest in using technology, uncomfortable with moving from their current method of delivery, lack of technical skills, lack of technical support, course constraints and role changes.

Therefore, institutional changes incorporating greater incentives for tutors to utilise the on-line technologies in their teaching and module design can be of benefit for those tutors who may be reluctant to change. These incentives can include improved levels of practical and technical support for tutors. Tutors should feel secure in the knowledge that they need only adapt the module in ways that are appropriate to them and their students rather than feel they need to utilise all the tools available. Tutors, for example, responded positively to the assignment submission tool that had been mandated by the IEI. Marking moderation was streamlined, with the IEI gaining at least a week or more in turnaround time. Some tutors were uncomfortable, initially, with the idea of marking on-line, with the technical aspect being the greatest barrier. However, after initial discussion and training, all staff chose to trial on-screen marking and as previously

mentioned, turn-around time was reduced from an average of three to four weeks to less than three weeks in all. On-demand support from the IEI was available for any tutors that required it. Almost all tutors expressed satisfaction with the levels of assignment submission, record taking and ease of use that resulted. Initially, resistance was detected from progressing students who felt anxious about using the new on-line tool. IEI staff identified these students early and provided extra support and guidance as required. Students now submit their assignments on-line as standard. There were several initial technical issues. A small number of distance-learning students had unreliable internet connections while others had difficulty in dealing with large files and images. These problems were followed-up and very CLEar instructions and specialised training for students was provided. All student and tutor feedback was considered and, where appropriate and feasible, changes were made and additional planning for subsequent semesters was implemented through an iterative and reflective process.

Students have reported positively on the importance of the ease of navigation in the on-line technologies. Being able to find resources quickly and easily, along with recognising new additions to the site at a glance, was stressed as vital. Students were also positive about the level of interactivity and feedback associated with quizzes, assignments and discussion forums. This was considered especially important when a question in a quiz was answered incorrectly. Students got a fast turn-around time response to their attempts at answering quizzes and on-line assessments. As well as getting an indication of whether they had answered the questions correctly or incorrectly, they were also offered a model answer wherever incorrect responses were given. This process, while of immense educational benefit to the students, also greatly reduces the drain on tutor's time.

In the case of the IEI distance-learning students, much of the support and encouragement is offered

through the on-line discussion boards and especially through the chat rooms. These tools are used as a means of communication with tutors, fellow students, and the IEI on task deadlines, requirements, and difficult questions that students could not find an answer to themselves. This is especially true of contact with the IEI, who checks the chat rooms at least twice a day; questions that IEI administrative staff cannot deal with are referred to the relevant moderator or tutor. Additionally, the support element is usually very strong through peer encouragement, and perceived tutor and administration support is crucial in promoting the students' motivation to use the on-line technologies (Ala-Mutka et al., 2009; Concannon et al., 2005). Feedback collected indicates that students feel a sense of support that their queries were dealt with in a timely and professional way. The more critical issue for students was their comfort in the knowledge that technical support was available, if needed. As mentioned, vital support is offered to the IEI students and tutors through training days, TEL Handbooks and then, as an on-demand support, during the business hours of the IEI.

The above findings provided valuable views on the ways that students used the on-line technologies to support their learning, both in terms of how they find and use information and in how they use different communication mechanisms to raise queries and discuss issues with other students, their tutors and the IEI. It also demonstrates how important it is for the initial designers of the modules to be proficient in the pedagogy, technical and social aspects of using on-line technologies. The feedback results suggest that flexible, blended learning innovations of this type may provide a mechanism for improving student responses to education and for maintaining completion rates. This is consistent with the findings of previous researchers who advocate web-based delivery of programmes (Dorrian et al., 2009). In summary, the points listed below are essential requirements, from the point of view of the IEI, for implement-

ing on-line technologies in its distance learning programmes.

- **Communication:** Providing CLEar and detailed instructions and creating appropriate student and tutor expectations of the new technologies.
- **Reducing anxiety and resistance to innovation:** Providing support for students and tutors who may not, initially, feel comfortable operating in the on-line virtual environment.
- **Formal and informal evaluation processes:** Documenting areas of technology that can be improved through reflective iteration.
- **Continued development:** Involving teams of tutors in seminar formats that can provide a high degree of technical and pedagogical support.

Further Research and Continued Development

The development of these on-line techniques and the pedagogical support required must not remain at a standstill. Innovation, improvements and suggestions from current and future system users are essential. It should also be noted that ensuring the mainstream practice of utilising Sakai and Adobe Connect Pro at the University of Limerick, relies on the quality of educational content placed on the systems. Participants were unanimous in the view that TEL is not only the result of technological innovation, but embracing TEL requires far more than the introduction of new tools. It depends more on pedagogical and organisational innovation than on technology (Ala-Mutka et al., 2009).

The IEI has made the move to technology-enhanced learning and to maintain and deliver the best programmes, it must take advantage of more flexible arrangements and the ability of TEL to improve the delivery and support of its programmes.

Taken together, this process has highlighted the importance of open communication, reducing anxiety and resistance to innovation, formal and informal evaluation processes and continued systems development. IEI students are using technologies to support all aspects of learning; directed study, resource discovery, preparation and completion of assignments, communication and collaboration, presentation and reflection. Technology should not, therefore, be simply seen as an 'add-on' for these students. The technologies should provide them with a rich variety of alternatives for interaction and communication in relation to learning and a flexibility of use that enables them to take control of their learning. A new culture must be fostered, where being at school is a motivating, engaging experience, where learners are active stakeholders, where they are owners of tangible learning outcomes (Ala-Mutka et al., 2009).

The pedagogy of on-line tutorials must be incorporated into any training sessions for the software. For IEI tutors, who may have little or no experience in education formats that utilise on-line technologies, the move to on-line teaching involved, in some cases, a drastic change. Access to this new technology involved technical aspects, sufficient skills and adequate understanding of the technology utilised to facilitate education in a virtual environment (Delfino et al., 2007; Kingsley et al., 2009), and the shifting of the primary role of the teacher from dispensing information to facilitating learning (Lockyer et al., 2006). Bennett (2004) also states that adapting to on-line environments has required the development of new skills and changes to teaching practices (Bennett et al., 2004). Currently, the IEI is investing time and effort on a planned continuous professional development (CPD) initiative on the pedagogy of on-line tutorials to assist with these changes. As on-line tutorial development is more challenging, initially, time and technology-wise, the tutorials will be developed over a number of weeks to allow for reflective learning, iterative and reflective design. Tutors will collaborate over

time in achieving a pedagogical approach appropriate for on-line delivery. The learning activities in each module will be subjected to an iterative process of reflective observation, acting, sharing and evaluation with colleagues where they will use both on-line “real-world” discussion to build new understandings or to support one another in what will be, for many, a new territory with new pedagogical demands. The evaluation of its impact will be focused on the changes to pedagogy induced by the CPD initiative, the challenges and new opportunities met, and the students’ and coordinators’ perspectives on the process. Some of the possible questions include these: What new teaching methodologies have been deployed in the on-line tutorials? What competences have tutors acquired that enabled this and what further needs exists? What has been the impact on learners of the methodologies used? Which are the most effective methodologies?

Additional and potential developments might include for consideration the following pedagogical and interactive innovations:

- the use of standalone multimedia to bring immediate access to images, sounds or animations of complex theories
- the development of Flash demos to explain more complex theories
- the guidance of students to Internet resources and the use of, for example, book publishers’ accompanying web-based resources, particularly in science and business disciplines – this is a viable alternative to creating “in house” resources
- developing collaborative ventures with OpenLearn universities in other countries.

Conclusion

Educational technologies are most effective when used properly (Savoy et al., 2009). While many of the same teaching principles apply in face-to-face and on-line tutorials, the latter involves an added

layer of complexity and is not comparable in terms of what can be achieved in the same number of hours. On-line tutoring requires time, competence and commitment. Bennett et al., (2004) also propose that enhanced student learning outcomes have been realized when cognitively powerful pedagogical strategies such as collaborative, case-based, problem-based or authentic learning are implemented within technology-supported environments. Through the support of the University of Limerick, tutors are encouraged to use a combination of the more traditional forms of communication and information transfer (e.g. tutorials, labs/workshops, printed material) and the more innovative methods through Adobe Connect Pro and SAKAI (websites, chat rooms, discussion boards, on-line tutorials, on-line assessment, on-line grading/feedback). The IEI aims to enhance the more traditional learning opportunities by a careful integration and mix of new technology-enabled teaching and learning systems.

Complementing traditional educational models with TEL tools is dramatically changing the role of the educator. They are becoming facilitators of the processes of gaining knowledge, in which learners take a far more active part than they have ever done. The tutors’ capabilities, enhanced by the availability of TEL resources, enable the creation of motivation in students that encourages them to commit to self-directed learning experiences. It also provides them with structures that keep them focused on the learning objectives and highlighting critical features of the task that they might overlook. This, in turn, facilitates the carrying out of the learning activities so that objectives are met (Ala-Mutka et al., 2009).

It is essential that tutors, who are module content specialists, appreciate the importance of developing necessary pedagogical skills associated with on-line tutoring. Sometimes, tutors may feel constrained by pedagogical issues. In almost all cases, this anxiety and/or resistance is relieved once the technology is used by the individuals and

a degree of familiarity is established. It is necessary in all cases that CLEar and detailed instructions are provided regardless of the experience of the user. An established suggestion is to presume the end user has never encountered the system previously. It is also necessary, especially in the case of the tutor, that the appropriate expectations of any new systems are created.

Student learning is now undertaken in a complex and changing environment, with a wide range of technological tools for support. Computer ownership and Internet access is high and students have become accustomed to being able to electronically access information or people on demand (Conole et al., 2007). It is also generally acknowledged that the emerging educational formats of using interactive on-line technologies are more engaging for the learner than the traditional education formats. Engagement and motivation are critical factors for the success of learning experiences and TEL affects the learning processes by engaging participants in learning dynamics that enhance their motivation (Ala-Mutka et al., 2009).

In the higher education programmes offered by the IEI, the utilisation of on-line technologies has become an expected and integral part of the learning process for students. Most participants agreed that the on-line technology integration was also an expected and necessary part of their university experience and of use in their future careers. Major benefits noted included the ease of access to resources, including peer-reviewed journals through the library, and the provision of a central area for students to access and to find information on comprehensive resources pertaining to each module. Negative experiences focused predominately on technical problems that were often due to inexperience in the use of the technology on the part of the student and/or tutor. It is CLEar from this evidence that to look only at the positive and negative factors of technology, is to miss the wider factors impinging on students' use

of it as a support mechanism. Age-old problems of students' motivation, peer influence, and study strategy are all as important to the learning process, as are access to technology and computer skills. However, of primary importance to the process were peer encouragement and perceived lecturer and tutor support (Concannon et al., 2005).

In summary, pedagogy, technology and social interaction are critical components of a technology-enhanced learning environment. Technology is more likely to be a basic condition for effective integration of TEL. Sound design of pedagogy or social interaction very much depends on the availability of technological support. Without sufficient support of the technology, many pedagogical and social design activities would be difficult to implement. However, the primary factor that influences the effectiveness of learning is not the availability of technology, but the pedagogical and social design underlying the use of that technology. In general, the IEI found that students consider TEL a valuable support to the learning process. They see it as an additional reinforcement to the traditional face-to-face delivery mechanisms, and they make regular use of the on-line technologies flexible access, and the incentive it provides for ongoing study and continuous assessment in preparation for the final assessments. TEL, based on a solid pedagogic foundation and providing feedback, interaction and access to course materials, is seen as both a benefit, and an improvement in educational delivery and support.

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ENDNOTES

- ¹ In this chapter, tutor refers to the individuals involved in the design, instruction, moderation and delivery of modules in conjunction with the IEI.
- ² In this chapter, on-line technologies refer to the use of CLE's and Adobe Connect Pro in conjunction with distance learning.
- ³ Mature students at the University of Limerick are considered to be over 23 years of age at the time of enrolment.

APPENDIX 1: TRANSCRIPT OF A PRESENTATION BY THE IEI TO FACULTY AT THE UL

A session of one hour was organised at the beginning of the second semester of 2009 in order to share the experience of the **IEI** with other interested faculty members. The session commenced with a presentation on the use of Sulis and Adobe Connect by the **IEI**, followed by a live demo of the technology and questions and answers session as transcribed below

Why did you start using this type of technology?

By the very nature of the fact that we are **distance learning**, the **distance learning** students can feel a sense of isolation while studying with us. Our function, and one of our primary functions within the **IEI** is to minimise this sense of isolation and to support the students, and have them integrated into the University community and to make them feel a part of a group as best as we can and obviously technology has helped us an awful lot with this.

When did you start using Sulis and Adobe Connect?

The whole programme has evolved hugely within the last ten years, particularly with the development of technology, and Sulis is one of those tools that have really helped us along that way. Prior to Sulis we had a different **CLE** called “TopClass”; we had a perpetual licence and the tools that it had were limited. Then Sulis came on board around three years ago, supported by the University of Limerick. With Adobe Connect we started about a year ago, we’ve done two semesters now, we piloted it first, this time last year and then in September we went forward with a whole stage, so all 5 and 6 stage modules and anyone who signed up for it was desktop to desktop through Adobe and it’s worked, and it’s working so far very well.

So you have not had any major problems?

It’s worked very well. I suppose it should be pointed out that we’re different from the university in that we enrol twice a year, all our modules run twice a year so that gives students the opportunity to complete the programme within their own time and it’s a way for us then to provide these services, it’s essential then that they have the support mechanism here at the University for that. Our main problems arise from how computer literate the individual student is.

How do you organise the sessions in Adobe Connect? Do you send them notifications in advance?

Yeah, when you set up your meeting room each student is issued with an email that has a link to unique module room. Adobe also allows us to record the **tutorials** based on the permission of the tutor. So it means that we can link them back into Sulis, and if the tutor is ok with it, we can have links put up on that specific module site if the students could not make the tutorial.

What time do you normally do it?

Generally, we try to timetable in the evenings, from about six o'clock onwards because most people are working in between the hours of nine and five and **tutorials** are generally scheduled for an hour and a half. They are sent an email for Adobe Connect at least a week before, if not more. They're also sent text reminders to their phone to say, "Don't forget your tutorial", they also receive the timetables at the start of the semester, and they also can log into the calendar on Sulis, if they really forget about it. So, after all that there should be no excuse for them not being available. We provide them with the training at the start of the semester before their first tutorial, so that they can have their computer set up, with their headset working, or camera working. So, they're sent an email, it has a link on it, they click the link, they put their name in the guest box, and then they're into the room. So, you can only access the room if you have the link from the email. We supply them with headsets and web-cameras, we do give them the specs of the ones we use so they do have the opportunity to purchase them themselves or if they have them themselves we let them use that, but they need to have access to a computer and broadband internet.

What is the main advantage of using these technologies?

The main thing about Sulis and Adobe Connect is that we are trying to encourage as much collaborative learning as possible. One of the methods for Sulis is the use of discussion tools. Students are assessed on how well they argue a point in a discussion, as well with Adobe Connect, the students can see each other, they can see the tutor and they have the opportunity of interacting as they would in a live situation. Some of our students are as far away as Donegal or Antrim, and for them to travel all the way to Limerick can be quite a big deal, so this way we're trying to increase the numbers that attend a tutorial. Most of the **tutorials** are not compulsory and we are trying to show them that if they attend a tutorial that they will learn more, but it is trying to keep them attending the **tutorials** that is the difficulty. There is a lot of opportunity for using Sulis, it has the potential to really increase the teaching ability of the tutor, to improve how a student learns, but I mean there is an awful lot of opportunity for research into that area with regard to Sulis. We're only just touching the surface on how you use Sulis as a teaching mechanism.

When using quizzes in Sulis, do you have any way of knowing if they're copying?

No, it is a leap of faith, one way of preventing copying is to time the assessment. But there's no guarantee in any assignment that it's the students own either. We try and keep it as secure as possible; we try to prevent plagiarism by submitting assignments through anti-plagiarism software, as much as possible. The on-line quizzes can be quite short or they can be extremely long. If they're extremely long they have a large number of questions and the exact time they require to do it, otherwise you put a really short paper up and they have a very short time, so I mean, they could be getting help, but there's very little you can do about it. But we try and, we trust them as much as we trust a full time on campus student.

So there's more assessments done, not only on-line quizzes?

Yeah, the assessment, depending on the module, some modules have one or two assignments, they have a full written at the end, same as the full time students, and they either have lab days, practical sessions, or they would have an on-line quiz, depending on the module, it's up to the moderator of the module to determine how they wish to assess the module, same as the full time.

So there are some outside visits or are they just for lab days?

Yeah, they'd have to, for example anatomy and physiology, come to the University for the full day and they'd do a lab day and they have a small examination at the end of it, but that lab day, I think forms 30% of their overall grade and their assignment would have formed another 30% of their overall grade and they're written examinations would form 40% of their overall grade. We generally do three field visits a semester, and so the three that will run maybe in the Autumn semester are different to the ones that run in Spring, and we try to space them out and vary them year on year, as much as we can. This allows a student coming through the Certificate programme to get a feel for a lot of different activities.

Do they have to have software downloaded to enter or Adobe Reader?

No, Adobe Connect is delivered across the internet with the ubiquitous Flash Player, so as long as they have latest the flash player, they've no problems with it. It even prompts you at the start to download the latest Flash Player if your computer does not have it.

What kind of numbers do you have to have in the tutorials?

We've not used Adobe Connect for large numbers, the maximum we've used it for would be about six plus a presenter at a time. A lot of it will depend on the individual's connection to the internet, both student and tutor and on the level of computer literacy of both the student and the tutor, that would be the main factors holding the numbers back. From our current experience, unless the tutor is very experienced using **virtual environments**, smaller numbers in rooms have worked well whereas larger numbers have provided confusion.

Is there any concern about the difficulty of using Sulis and Adobe?

So far no major concerns. We always try to personalise the meeting rooms a little bit, so that when students do actually click onto something they know that they are in the right place (such as an **IEI** logo). Basically, a tutor will enter and will then activate the meeting room for the students. Once the student enters you can see that their name will pop up on the left hand side in the attendee list pod. Once a tutor is in Adobe and they see a student entering into the room, they can then at that stage activate the students' voice and camera. The tutor has control over the system. They communicate, if there are any problems at that stage with the students; being able to hear the tutor etc., the chat room comes in very useful because they can type their concerns, "Listen, I can see you, but I can't hear you", and then if necessary we go through the troubleshooting that we have just set out for Adobe. Once students and tutors are used to using it and everything has been set up once, they are generally ok. We've had students

who wouldn't be hugely IT literate and they've had no problems at all really. They've found it fantastic, and like we've said earlier it means that they can go from the dinner table to the computer to the tutorial and it's worked out really well. The tutor then can share their screen, they can share their documents, if there's something that they are working on, that they're sharing with a student for example, they can actually go to the students' screen to see what they're doing, or what's happening on their screen. Any file format can be preloaded, if a tutor is having a tutorial, they send us their notes the day before. We have them uploaded, if there're any graphics that they want uploaded, any sound files, we can have all that uploaded prior to their tutorial of an evening, so that they can come in and just be able to access it, there's no fuss then that way. There have been some complaints about the time lag in the audio, but this is unfortunately dependant on the individuals' network connection.

If you wanted to, could you prerecord lectures or tutorials and put them up then? So they could access them anytime they needed if your numbers got too big.

Yeah, you could. We have recorded some **tutorials**, and training films. Tutors can sit in front of their computer and record all that takes place on the screen. You could have your webcam there and record yourself talking and then send the students a link, and say that this is the link to it.

You've asked them to still their pictures so you're not going to see their mouths going, but you can hear them.

You can turn off their microphones as well during the presentation. If their microphones are on and their cameras are on there's absolute real time communication. There are two options, you can set up that anybody can talk at any time, or that only one person can talk at a time, that's a setting that you set up when you set up the meeting room. We issued them with a document with instructions on Sulis and on Adobe Connect and part of it is what we call etiquette or protocol for using the room, for example we say if you wish to ask a question, you must raise your hand, and then the tutor can say "oh I see John has a question, what is your question?" And then you ask your question. So it doesn't really interrupt the flow of conversation as it is going on in the tutorial.

Is it completely live?

There is a very slight audio delay due to broadband speed. It is noticeable though if you are asking questions, in any of these desktop to desktop software products like Skype or anything like that, there is a fraction of a delay and we guess it is about two seconds with Adobe Connect, so it means that if somebody asks a questions without raising their virtual hand, there's a two second delay, the tutor is then interrupted talking, and then by the time you get it sorted out there's a bit of a delay the flow of the tutorial is gone, so that's why we say "use these little protocol tools". There's a whole variety them; laugh, disagree, I've stepped away for a moment. You know there is a lot of opportunity for students to interact. You have different looks as well, if you want a discussion look, the presentation goes away the chat area becomes bigger, you can have discussion notes, you can put in a little poll... collaboration views then are different, these are just default settings, so again you have a white board, even divide up your class and discuss a topic, go away and discuss it and come back and you can actually divide

up the room into little discussions as well. We haven't used that, but we have looked at the possibility of that. To compensate for the audio time delay we are looking into using Audio Conferencing where Adobe Connect will dial out to a phone number of choice and therefore eliminates the time delay issue.

When you got the licence, did you figure this out though a user manual or did you have someone show you how to use it?

No, we tend to figure out everything ourselves. The company provided us with great support, there are endless amounts of documentation that you can read, but we did find it was pretty intuitive in that once you got in there and worked through it, it actually was fine.

How long are those tutorial sessions?

About an hour and a half, sometimes an hour, sometimes two hours; depends on the tutor.

Tutorials are optional, it's not mandatory to go to those, assessment isn't built into it?

No. Some of them, such as the IT modules and Horsemanship **tutorials** are compulsory, the labs of certain modules are compulsory, but the majority of **tutorials** are entirely optional and because our students tend to have to travel so far we can't say that every tutorial is compulsory. We do say that they are highly valuable and are well worth attending, and the students that do attend tend to get the higher grades than those who didn't, so our way of thinking was trying to find a way that we could get students to attend the **tutorials** without beating them over the head with a stick and **Adobe Connect Provided** a way of delivering it to the computer at home.

And do you combine with face to face, or is it all done on-line?

The first of three **tutorials** beginning in the coming semester will be face-to-face. This face-to-face day will also incorporate technical training in Sulis and Adobe Connect. The additional two **tutorials** will be delivered on-line for the majority of modules.

And do people, do those that can't take the synchronies version, do many use it afterwards?

They do they have a look at it. We have a centre based in Northern Ireland in Greenmount College, and they actually came in and said "Oh, we can access **tutorials** from previous semesters, this is great for us, for helping the students as well". The genetics tutor up there was able to access the tutorial that we had recorded last Spring. We train the Greenmount tutors as well on Adobe Connect. Our main issues really with any of this technology is, the more the tutors will use the system, the more the students will use the system, and if the students are using the system and are finding that there is nobody at the other end, then they are less inclined to use it again. The whole point of the system is to encourage collaboration, to encourage students, therefore a lot of our work is really trying to get the tutors to use the system. It sometimes takes that little bit longer, but it is well worth the benefit at the end and it seems to be work-

ing out well. We've received very positive feedback from all angles and if we were to turn the clock back now I think we would find it very hard, they've come to depend on it. The tutors themselves can be at home, they need never travel, because not all of our tutors are based at UL, some of our Anatomy tutors for example are vets, and they are out and about and for them to come to the University is a little bit more complicated than say being able to sit at home in your living room when you have an hour.

**Is Sulis there for a point, you know where they go to start any of this?
So they can reach everything without going somewhere else.**

Yeah, they have access to everything available to fulltime students through Sulis. They can access on-line journals, books, and soon video clips and short films to name but a few.

Is there a notice to say there are lectures here?

There is literally anything we think is of benefit to students on Sulis; access to the library, your blog, podcasts... they've exam timetables, field trip information, and registration forms as well as any extra information we feel the students might need. This semester we've said when you're registering instead of us sending out all the information, go to Sulis, or go to the main website and download it. We're trying to reduce how much we send out, because we use to send out pages of information.

**Are there links to the articles there, do they get
linked directly to on-line articles?**

They are linked directly to the on-line articles, or sometimes an article link is sent to us from tutors. Sometimes if its articles written by academic staff or people, then we can just post it up and that's perfectly fine, but yeah copyright is a big issue.