A Nurse Prescribing Programme Incorporating e-Learning

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Abstract: In order to become a UK Nurse Prescriber, a First Level Registered Nurse must undergo an approved University based educational programme, which consists of theory, and a period of practice supervised by doctors. The Nursing and Midwifery Council (NMC) requires nurses undertaking this programme to have some formal university attendance and to be assessed in practice. Successful students are recorded on the national NMC register. Since October 2004, the University of Winchester has used blended learning incorporating e-learning for the delivery of the Nurse Prescribing Programme using online material developed by Emap Publishing in conjunction with the University of Stirling. This paper discusses the effectiveness of the programme and the evaluation of the initial six cohorts *(127 students)* who studied the Nurse Prescribing Programme undertaken by e-learning through the University of Winchester.

Keywords: Nurse prescribing, evaluation, e-learning, designated medical practitioner

1. Introduction

The traditional belief about nurse education since its inception has been that nurses belong to a homogeneous group and that all its members acquire knowledge and skills in a similar way. Traditionally, nursing courses have tended to be similar in content and delivered in a classroom by a tutor acting sometimes as facilitator, but more often as pedagogue (Doster, 2004). Such an approach is not always appropriate and much more consideration is now being given to students' reasons for undertaking a course, how they learn best and individual work experiences coupled to the efficient use of accreditation of prior experiential learning (AP(E)L). Adult learners are motivated by many different factors, and develop their own unique learning styles which vary according to context, task and the age of the learner (Figueira, 2006). In addition, the opportunity to choose how to receive and engage with course material, the pace at which that material is delivered and the flexibility to apply material gradually in the workplace is very appealing to some people. It has been suggested that educational programmes have most impact when they accommodate individual learning styles through the provision of different kinds of learning opportunity, and provide sufficient and immediate feedback (Dobrovolny, 2003).

The Medicinal Products: Prescribing by Nurses Act, 1992 transformed the role of UK nurses in the management of drugs. The introduction of independent extended prescribing in 2002 (Department of Heath (DoH), 2001) and supplementary prescribing in 2003 (DoH, 2002) has expanded the prescribing powers of the nurse further. By the end of 2006 there were 10,000 trained nurse prescribers in the UK (Courteney 2006). To respond to these initiatives the University of Winchester introduced in 2004 an Independent, Extended and Supplementary (IES) Nurse Prescribing Programme as a 40 credit module for qualified nurses. This Programme could be undertaken as a module of the BSc(Hons) Professional Practice in Health and Social Care Programme *(a distance learning programme)* or independently as a standalone professional module. The key point about this IES Prescribers' Programme was that it used a blended learning based upon a core of e-learning materials. The Programme allowed a high level of flexibility designed to meet individual students' needs and reduced the number of direct contact days at the University including travel overheads. The IES Nurse Prescribing Programme is successful and was commended by the UK Quality Assurance Agency (QAA) in October 2006. This paper describes the Programme, how it has been implemented using e-learning techniques and the results of its ongoing evaluation.

2. Nurse prescribers' IES learning programme

In England, the taught IES Prescribing Programme normally requires 26 days attendance at a university. Using blended learning techniques meant that attendance at this university was only required for 6 days. In October 2006, this was extended to 8 study days to meet new NMC standards. There are 3 intakes a year and the Programme provides the students with academic input related to practice through lectures, seminars with pharmacists, nurse prescribers and other relevant healthcare professionals. There are also periods of practical work based learning supported by a core of e-learning material (Burgess et al, 2006).

2.1 The Emap online IES nurse prescribing programme

The IES Nurse Prescribing Programme was developed by Emap in 2004 in conjunction with the University of Stirling and implemented within the Winchester University Virtual Learning Environment (VLE) and delivered

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on demand over the Internet. The University of Winchester was the first Higher Education institution in England to gain approval from the NMC to deliver this 'online' programme, which commenced in October 2004 with students recruited from all over England. The web pages contain structured materials with further reading prompts and tasks to guide the students. Example pages are shown at Figures 1 and 2.
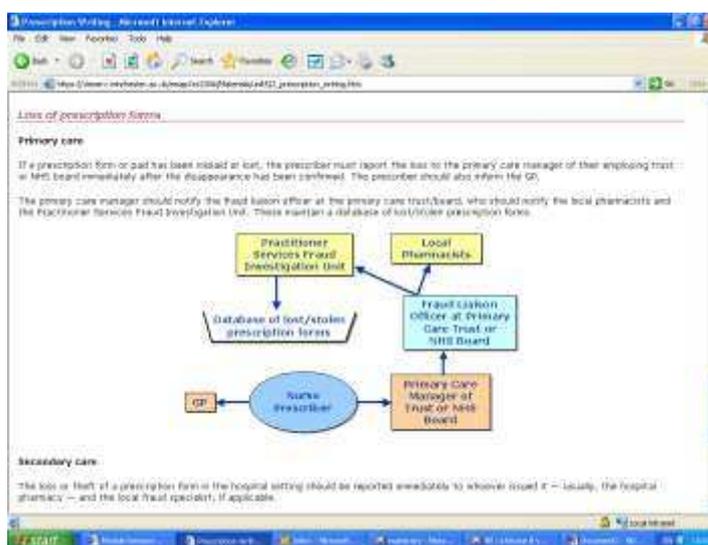

Figure 1: The homepage

Figure 2: An example page

2.2 Nature of the student population

This distance learning programme is ideal for nurses who are unable to take time away from their work base to attend a traditional course of 26 days. Most of the students are employed on a full time basis, and are in a position of some responsibility when they undertake this part-time course. Also they often have families and a home to run. Finding time for study can be very difficult, and requires skilled time management. This flexible online programme enables employers to be more flexible in the way they allocate study time to students, something which is now subject to an NMC standard and which must be audited (Hart et al, 2005). Initially the majority of the nurses were from the community sector and then from the NHS hospitals. More recently there has been an increase in the number of students from the armed forces, the private sector and the self employed.

2.3 Student use of information technology

The IES Programme requires the nurse prescribing students to have the basic skills and knowledge to use a personal computer, the Internet and online learning materials. A minimum hardware specification is required to access the e-learning material and recommended specifications are supplied in leaflets, along with guides to computing and studying away from the University.

The nurse prescribing students are set an exercise to determine the level of their IT skills and there is considerable variation in the IT skill levels of the students. Therefore, all students are provided with the free opportunity to undertake the European Computer Driving Licence (ECDL) to improve their IT competency.

Students are required to confirm and describe their access to IT facilities at home and in the workplace. For workplace facilities, specific permission for use during these studies is required and the level of availability must also be confirmed. For example a student was overheard to say they could only access the learning material once a week because the location of her job had changed and she was peripatetic across clinics where she did not have Internet access. As a result of this the IT availability for students is now reconfirmed at regular intervals. In some cases prospective students demonstrate that they have no access to IT at home and/or in the workplace. Following discussion some of these prospective students have been advised to consider undertaking a traditional course at another institution.

Students are introduced to the e-learning material through a log on exercise at the start of the IES Programme during the two day induction period. The log on exercise is supported by the VLE specialist, Programme Leader and an IT technician. During this session the students are given advice on how to work through the IES Programme in relation to their study days and assessment criteria. Students leave the session having successfully accessed the learning material twice and undertaken a small test to demonstrate that they can find a certain section of the learning material and leave messages. As a confirmatory test all students are asked to access the IES Programme remotely within 24 hours and leave a message.

The University of Winchester VLE includes a 'café forum' area where students can communicate and exchange information. Programme tutors also use the VLE to distribute other resources and information to students such as study day information, standard forms and handbooks. A notice board specific to the IES Programme keeps students in touch with developments. Support for passwords, technical queries or training is handled though a first line support 'IT helpdesk', supported by a second line VLE specialist.

There is electronic monitoring of students' access to the VLE and so it is possible to determine the frequency of students' access to the learning material. Of interest is the University policy and VLE requirement to re-key the password at the 3 month point. If a student had not been accessing the learning materials for a period then this change could be missed, so as an exception the password validity period for nurse prescribing students has been increased to cover the 6 month length of the Programme.

2.4 Tutorial support

Students are allocated to tutors geographically dispersed across England and, where possible, students' and tutors' nursing specialisms are matched. Tutors are the students' initial point of contact for all Programme matters and problems and tutors liaise with the Programme Leader based at the University. The focus of learning is related to students' areas of nursing specialisms especially during their 12 days in practice. However, students are also encouraged to widen their prescribing experience outside their normal place of work by working alongside other prescribing professionals. Students must negotiate a minimum contact time of 10 hours with their tutors during the 6 month period as well as the method of communication to be used (face to face via group or individual tutorials, telephone, or email.) Tutors not only provide personal support, but advise students about academic assessment and give feedback on assignments and examinations. The strength of this tutorial support has been a major success factor in this Programme.

2.5 Designated Medical Practitioners (DMP) – doctors

The first co-ordination meeting between the DMP, the student and the tutor, at the student's place of work, covers the learning outcomes of the course, how the student is to be assessed in practice, and how the documented evidence is to be created and maintained. The DMP role is primarily that of a mentor and assessor of competency during the course including the 12 days of supervised practice. To widen a student's experience, the DMP may delegate this responsibility to other health care professionals who are involved in prescribing.

2.6 Student assessment

The assessment of the IES Prescribers' Programme consists of a:
- Written examination with a NMC standard pass mark of 80%*.*

- A mathematics test *(100% Accuracy required)* was implemented in May 2006 to meet NMC standards.
- 3,000 word reflective essay.
- Evidence based portfolio of their 12 days supervised practice demonstrating their competence, which must be verified by their DMP including examples of prescribing episodes.

2.7 National registration of successful students

The University notifies the NMC about the students who complete the Programme successfully. The students are then sent a registration form which they must complete and return with a fee to the NMC. Their names, already recorded on the national NMC Professional Register, are then annotated as 'Nurse Prescribers'.

3. Evaluation method

This Programme is subject to a long term evaluation process which will examine not only the effectiveness of the Programme in preparing qualified nurses to become prescribers, but also the effectiveness of e-learning as a learning methodology as compared to traditionally taught courses. The evaluation of the Programme has been carried out using two questionnaires presented to students at the end of the study period. Questionnaire 1, devised by the teaching team, requested the students to provide responses to assess the overall Programme. Questionnaire 2, devised by Emap, requested the students to focus on assessing the utility of the e-learning materials.

4. The initial evaluation of the prescribers programme

The results of Questionnaire 1 over 6 student cohorts are shown by the graph at Figure 3. Overall the Programme was assessed satisfactory to excellent with the majority of the students evaluating the Programme as 'good'.
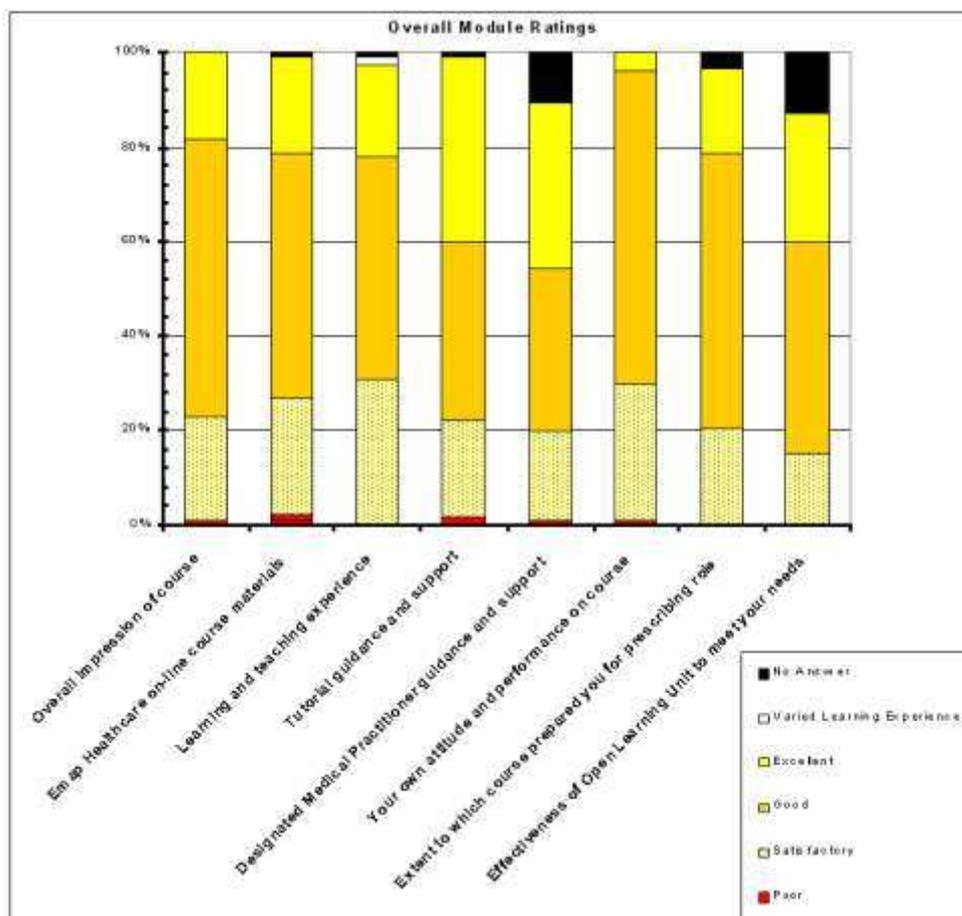

Figure 3: Questionnaire 1 - Overall module ratings based on 127 students – 6 cohorts (Question topics are summarised on the graph)

The results of Questionnaire 2 (Emap Questionnaire) which requests the students to focus on assessing the utility of the learning materials are shown at Table 1. A number of students belonging to the early Cohorts 1-3 identified the following issues:

- Familiarity with distance learning Techniques. Despite the students not being familiar with distance learning techniques and the level of personal self discipline and commitment required, the majority liked the student directed flexible approach, where they felt in control and could study at their own pace and, more importantly to them, it fitted around their work, home and social commitments. However, the students, who gave 'poor' ratings during evaluations, were found to have had no previous experience of distance learning techniques and were expecting far more tutorial support than was available. As a result the pre-course information was expanded to explain the requirements of distance learning in more detail and enhanced tutorial support was provided on a flexible basis.

- Referencing. Some references were reported as being out of date. This was corrected.

- Internet links. It was reported that there were too many distracting links and some Internet links did not work. This was corrected.

- Online Tests. It was proposed that there should have been online tests after every unit as well as including mock examinations and other examples of assessment. Online tests have now been included.

- Pharmacological background material. It was proposed that some of the pharmacological aspects should be expanded, although the online information was supported by lectures on Pharmacology which were rated as very good. The amount of Pharmacology in the online material had been judged by the Emap development team to meet the necessary level of knowledge, however, responding to the feedback, Emap acknowledged that further development was required.

- Off-line Study. The online materials were criticised by a small number of students in that they were also expected to undertake library searches and read hard copy texts. One student felt that all materials should be online. However, it is considered that undertaking library searches ensures the students develop and maintain this skill and no changes have been carried out in this area.

The evaluation questionnaires at the end of the Programme period and students' comments on the learning material were passed to Emap for assessment and action. Emap was responsible for carrying out changes to the programme study materials. The new NMC Standards for nurse prescribing were included in the Programme as were any changes to prescribing laws and formularies. The issues above were assessed, discussed at the annual co-ordination meeting and corrected as required. The issues above were not identified again by cohorts 4-6.

From October 2007 Emap will no longer be involved and this work will be carried out by the University of Stirling, the initial designer of the Programme.

5. Discussion

5.1 Learning and teaching experience

The Programme requires compulsory attendance at University for 8 days over a period of 6 months, which is one or two days per month coupled to about 170 hours of study time and 12 days of work based experience and assessment. The NMC has expected employers to allow students to have additional time off work to help meet the 170 hour e-learning commitment. However, some students have found that their managers have not recognised the need to provide them with additional study time to enable them to study the online material and prepare for assessments time beyond the 8 university days allocated. In October 2006 the NMC's new standards required all nurse managers to provide student nurse prescribers with 10 days worth of protected learning time. Despite this measure and fact that the students should be at Level 3 – degree level *(independent learners),* there is still a considerable time management problem in negotiating when to take the 10 days worth of protected learning *(about 80 hours – 3 hours per week)* and how to earmark the balance of the study time *(about 90 hours – 3-4 hours per week)* in their own time. There is little scope for slippage because of the frequency of university attendance. The distance learning approach provides for considerable flexibility, but it does require dedication, commitment and routine. Students must also be

disciplined in their studies and not be distracted by the Internet into using up valuable study time investigating matters that are not directly relevant to the Programme.

Table 1: Questionnaire 2 - Summary of Emap evaluation questionnaire

Modules (Started Oct 04-Oct 06 - % of 127 students)	Very Poor	Poor	Satisfactory	Good	Excellent
Foundations of Prescribing Practice					
Content			31	59	9
Relevance to practice		1	29	61	9
Learning experience			31	61	9
Easy to remember			36	57	6
Clinical Pharmacology Including the Effects of Co-morbidity					
Content		2	22	63	13
Relevance to practice		2	24	61	13
Learning experience		2	26	61	11
Easy to remember		2	32	58	8
Prescribing and the Wider Healthcare Context					
Content			28	64	8
Relevance to practice			28	63	9
Learning experience			30	63	6
Easy to remember		1	31	62	6
Prescribing Partnerships					
Content			33	58	9
Relevance to practice		1	30	61	8
Learning experience			35	57	7
Easy to remember		1	39	54	6
Prescribing in Practice					
Content			29	65	6
Relevance to practice			28	66	6
Learning experience		1	30	64	6
Easy to remember			34	61	5

5.2 Tutorial guidance and support

The IES Nurse Prescribing Programme is based on a significant amount of practice and work based assessment and this relies on a backbone of tutorial support. Tutorial requirements of students will vary considerably and the level of tutorial support is very much a matter of negotiation between the tutor and individual students. In general, the tutors have had 'good' to 'excellent' reviews by the majority of the students. However, while all tutors are required to carry out a set level of student contact and this is audited, it is clear that there is some variation in the proactivity and style of tutors. One of the overt aims of the staff development programme has been to encourage tutors to share and adopt a best practice approach and this has been facilitated through:

- pairing tutors with separate distance learning and prescribing backgrounds to provide mutual support,

- tutors' study days where the e-learning material is discussed in detail which encourages tutors to work through the material, so they are familiar with it,

- twice yearly meetings with agendas based upon spreading best practice where learning materials, student results, students' learning and student support issues are discussed,

- three marking and moderation meetings per year.

- peer reviews of tutors advising students so as to develop tutors' skills in this area,

- the Programme Leader accompanying new tutors to first visits with DMP.

As the IES Nurse Prescribing Programme has a significant e-learning component the tutor also provides online support with queries. In fact any tutor, with the right experience, can answer students specific queries online through the 'café forum' and this information is displayed for all students to see.

5.3 Designated medical practitioners (DMP)

The NMC and the IES Nurse Prescribing Programme require a significant contribution by DMP who must assess the professional competence of students. Students have in general found that DMP have supported their learning experiences with enthusiasm and commitment, and mostly rated the DMP support as 'very good'. This rating has improved with time, which may reflect the developing experience of DMP working with nurse prescribing students.

DMP support is to some extent outside the control of the University. However student success is linked firmly in the relationship between the DMP and the student as well as in the efficiency advantages nurse prescribing brings to the workplace. DMP are not provided with direct access to the e-learning materials, but the IES Nurse Prescribing materials have been validated nationally and conform to National Prescribing Centre Guidelines and therefore there is high confidence in them. However, DMP still have to be prepared to take on the supervisory task and this is carried out through:

- the DMP Information Pack which is sent to the student with the Application Form,

- the IES Nurse Prescribing Programme Documentation Pack (also sent to the student), which covers assessment, portfolio development and the contents of the Programme Handbook,

- a visit by the student's personal tutor to discuss the documentation and assessment ensures the DMP is familiar with the learning outcomes and the role in achieving them.

Despite this there have been some disappointments when some DMP found that they did not have the capacity to supervise prescribing students or appreciate the amount of work involved.

In investigating students' reflections about DMP support, it confirms that nurse prescribing is more than just learning to prescribe drugs. Whatever the level of DMP commitment to support students, nurse prescribing has changed the relationship between the DMP and the prescribing nurse. Nurses now have the knowledge and skills to share their concerns with DMP, when they might even disagree in the prescription of a particular drug. Being closer to the patient they may even understand the impact of drugs on a particular patient better than a DMP. The e-learning material covers the knowledge element and the study days cover the skills needed to act in this new role. Some of the assignments have been excellent expositions about these issues and these have contributed to the development of study days. However, the professional relationship between DMP and the nurse prescriber roles requires further research.

5.4 Student's perspective of attitude and performance

The majority of the students were experienced nurses *(10 years or more)* mostly in senior nursing positions. Most of the students elected to undertake the course to expand their knowledge and skills in an area of expertise that traditionally has been held by doctors and dentists. Some students had been directed to undertake this programme of professional development, so as to meet the changing demands of their nursing jobs. However, all students identified improvement to patient care as a major motivator.

The majority of students choose this distance/e-learning Programme to fit the study requirement into work demands and life style commitments. The Programme is a demanding option. Level 3 – degree level students are expected to be self-directed, be able to assess their own performance and have an insight into their own academic strengths and weaknesses. Students have reported being more in control of their learning and would choose this form of study in future. The vast majority of students would recommend the Programme to other nurses.

An advantage of using e-learning has been that the students have been developing and fine tuning their IT skills and that this has proved a bonus in their work. Some students have developed their IT skills to such an extent that they have felt motivated to continue with their studies at a higher level using the distance/e-learning route.

Some students gave poor ratings with the reason that the Programme and the online material were too generic and lacking in enough detail to support different nursing specialisations. The pre-course information and the NMC standards now make it clear that the preparation for nurse prescribing is generic. However, to address students' concerns one of the study days is now allocated to meeting the needs of the various nursing specialities.

5.5 Preparation for role

The Programme Team is about to start following up on students who have been carrying out the prescribing role for 12 months, particularly now that some past students have become lead prescribers in their own organisations. The purpose of the follow up study will be to ask the students to reflect critically about their preparation for the prescribing role using the distance/e-learning techniques and their real job experiences.

6. Conclusions

This has been an evaluation of 127 students undertaking a prescriptive and bounded e-learning programme; however some useful general conclusions can be made:

- This e-learning programme has demonstrated the advantages over traditional courses where students are unable to take time away from their work base to attend a traditional course and where most of the students are employed on a full time basis. Despite the majority of the students not being familiar with distance learning techniques, the level of personal self discipline and the commitment required; most students liked the student directed flexible approach, where they felt in control and could study at their own pace and, more importantly to them, it fitted around their work, home and social commitments. However, as with all professional studies, nurse prescribing students must be committed to the task and managers must provide the protected and auditable study time which has been negotiated. The e-learning approach provides for considerable flexibility, but it does require a dedicated routine.

- It must be expected that there will always be a considerable variation in the IT skill levels of the students and there should be parallel arrangements to develop their IT skills, so they can achieve the competency and have the confidence to use a computer before starting an e-learning programme. The positive feedback process which enables students to signal back to either their tutor or programme supplier that they have logged on to the material online successfully has been found to be useful. It is also necessary to ensure alignment of University computing policies with the needs of an e-learning programme particularly where the provision of e-learning is a relatively new concept for university computing support staff. Finally, an advantage of using e-learning has been that the students have been developing and fine tuning their IT skills and that this has proved a bonus in their work. Some students have developed their IT skills to such an extent that they have felt motivated to continue with their studies at a higher level using the distance/e-learning route.

- Strong tutorial support is an essential part of the IES Programme. It provides students not only with a point of contact, but with advice on academic assessment with feedback on assignments and examinations. It has been found essential to align the styles of tutors and considerable effort has been required in pairing and supervising experienced tutors with less experienced tutors, tutor training days and study days to develop consistency and reliability in the provision of advice and assessment.

- It has been found that there needs to be a regular review of the learning material and there must be mechanisms for modifying it in a timely manner on the basis of feedback from evaluations, mandatory changes to prescribing laws and adjustments to the formularies. A more frequent update process is now being considered in association with the University of Stirling.

- There has been a debate about the balance between how much of the learning material should be presented online, and how much directed or undirected research should be left to the student. It has been concluded at this stage that undertaking library searches ensures the students develop and maintain this professional enabling skill. On the other hand students' time must be used efficiently. Students must be disciplined in their studies and must not be attracted by the Internet into using up valuable study time investigating matters that are not directly relevant to completing the Programme.

- Nurses now have the knowledge and skills to share with the DMP their concerns when they may disagree in the prescribing of a particular drug. Nurses tend to have more in depth knowledge about some patients and they may even understand the impact of drugs on a particular patient better than a DMP. However, the professional relationship between DMP and the nurse prescriber roles requires further research into this whole new area of practice.

Overall, the students undertaking this e-learning Programme have reported being more in control of their learning and would choose this form of study in future. It is satisfying that the majority of students would recommend the Programme to other nurses.

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Exploring Virtual Opportunities to Enhance and Promote an Emergent Community of Practice

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Abstract: This paper gives an account of an attempt by an educational developer to support and strengthen an emergent Community of Practice (CoP) (Wenger 1998a). This community consists of members of staff associated in different capacities with the Centre for Interprofessional e-Learning (CIPeL), a Centre for Excellence in Teaching and Learning (CETL), based at Coventry University and Sheffield Hallam University. The support is specifically targeting CIPeL Secondees who are recruited to CIPeL on a part-time basis, for the purpose of creating interprofessional Learning Objects (LOs). While Secondees receive individual support, there is little formal contact between Secondees. An online CIPeL Community site was created, in order to provide a space where CIPeL members could meet virtually and share problems and experiences relating to the construction of LOs. Initially, the key question appeared to be how online participation by members of the community could be encouraged. Using Wenger's (1998a) CoP theory of learning, and after exploring how the Community site was being used, the focus of attention shifts to an exploration of reified objects and the role they play in guiding practice, which in this case relates to the creation and use of interprofessional LOs. This in turns leads to the difficult question of how relevant reified objects may be identified and built, and it is advocated that existing CIPeL LOs should be exploited as reified objects for the purpose of guiding the construction of new LOs. It is felt that invoking constructs from Wenger's (1998a) CoP theory of learning has resulted in a more detailed picture of the nature of the challenges involved in moving from an emergent CoP to more established practice. The approach has simultaneously helped clarify how support for an emergent CoP might be more effectively focused. As a final point, it is suggested that it may be fruitful to explore parallels between CIPeL as an emergent CoP and interprofessional practice (IPP) itself, based on the view that IPP is also an emergent practice.

Keywords: Communities of practice, learning objects, interprofessional learning objects, Interprofessional Practice, community development support, Reified Objects.

1. Introduction

Coventry's involvement with e-learning goes back a full decade at this point in time. Evaluations of commercially available Virtual Learning Environments (VLEs) started in 1997, leading to the selection of WebCT for a large-scale pilot project in 1998. By the start of the academic year 1999, WebCT was rolled out institution-wide, with the intention that the online environment should be used to enhance face-to-face teaching (Deepwell and Syson 1999). This move was not simply about making use of newly available educational technologies; it was based on considerations relating to the changing nature of the student body and the implications this had for approaches to teaching and learning. The government's Widening Participation agenda (DfES 2003a, DfES 2003b) for higher education meant that some students were less prepared for studying at University, both in terms of levels of knowledge attained within their subject and more specifically, their level of command of study skills. The availability of the VLE provided new options for academic staff to respond to this situation through the provision of additional materials and learning activities online, enhancements which could not have been offered in the absence of a VLE.

These early experimentations with online provisions of learning materials and learning activities can be viewed as a tentative step in the direction of a Learning Object paradigm. Students could access available materials repeatedly and opt to work beyond the basic requirements of the module, where online material supported this. In the School of Health and Social Sciences (now the Faculty of Health and Life Sciences), the late Anne Davidson was active in championing the use of the VLE and innovative approaches to teaching associated with it. She was amongst the first to link pedagogical opportunities afforded by the VLE with Learning Object technologies. Specifically, she pioneered the development and use of interprofessional LOs in the form of authentic patient journeys which demonstrated the input to patient care by a range of different health professionals. In 2002, Davidson became Principal Lecturer in Interprofessional Case Study Development. She collaborated with colleagues from within the faculty and from the Centre for Higher Education Development (now the Centre for the Study of Higher Education) on research into learning object design. She focused further on the question of how technical aspects of LOs could be reduced in complexity in order to make broad us of them acceptable to academic staff (Courtney, Davidson and Singh 2005, Davidson and Courtney 2004, Davidson and Courtney 2006). At Coventry, these efforts may be seen as the first beginnings of a Community of Practice concerned with the development of interprofessional LOs and their use in interprofessional education (IPE).

The Centre for Inter-Professional e-Learning (CIPeL) was created in 2005. Established by the Higher Education Funding Council, CIPeL is a collaborative Centre for Excellence in Teaching and Learning, involving Coventry University and Sheffield Hallam University. Interprofessional Learning represents an important Department of Health initiative for developing the National Health Service (NHS) workforce (DoH 2000). CAIPE, the UK Centre for the Advancement of Interprofessional Education, defines multiprofessional education on its website as 'a learning process in which different professionals learn from and about each other in order to develop collaborative practice.'

CIPeL's main aim is to develop and disseminate solutions to the barriers to interprofessional learning. Its focus is on innovative approaches to interprofessional learning which exploit new pedagogies and new technologies. Strong emphasis is placed on e-learning, coupled with the development and use of interprofessional Learning Objects (LOs). Both Coventry University and Sheffield Hallam University have an established tradition in this area and are thus able to build on research and developments that have taken place in the past.

This drive for a new pedagogy in supporting interprofessional learning is at the heart of CIPeL's agenda. Its approach is to offer funding to academic staff who wish to develop an interprofessional LO on a part-time basis. These LO developers are referred to as Secondees. Once a proposal for building a LO is accepted, Secondees are supported in their task by a number of professionals, including a member of CIPeL staff who will act as a mentor, a critical reader and a learning technologist.

Promoting the design and construction of interprofessional LOs is one of CIPeL's main foci. A second one is concerned with the development of a learning object economy in the area of interprofessional learning. To this end, it is in the process of establishing a repository which will hold interprofessional LOs that will be made available to a wider community, both within and beyond the two universities involved with CIPeL.

A third strand of CIPeL's work is concerned with research relating to the development of a learning object economy that is specific to interprofessional learning. Its research and evaluation strategy (CIPeL 2006) lists, among other items, the following research questions:

- What is the nature of the relationship between learning object and learning activity?
- How does learning object complexity impact on its use and reuse?
- What makes for a successful learning object/activity?
- How can learning object reusability be strengthened?
- What models can be developed to understand the impact of learning objects on learning?

CIPeL's concerns are thus varied and complex. Its efforts are located at the intersection of a number of domains which may separately be characterised as innovative, emergent or challenging. The interprofessional practice agenda in health care is one of these. Teaching interprofessional practice adds another layer of innovation on top of the practice agenda. The development and use of LOs remains a domain of great complexity (Parrish 2004). Initialising a repository through defining and setting up an appropriate metadata schema and then populating it with interprofessional LOs represents a substantial challenge in its own right. A whole range of technologies are implicated in achieving CIPeL's multiple and interrelated objectives. Therefore, those who contribute to the CIPeL's enterprise work in a highly complex environment, well beyond their comfort zone. All of this makes the need for the provision of support for this community of practitioners substantial.

2. The CIPeL community site

2.1 The need for an online community space

Secondees either work individually or in pairs on a CIPeL project towards the production of an interprofessional LO. They work within a team, insofar as each project has the support of a staff member from the CIPeL core team, of a critical reader and of a learning technologist. This is using McDermott's definition of teams, which states that 'A team is a group of people with a common goal, interdependent work, and joint accountability for results' (McDermott 1999:2). However, there is generally little connection between the different Secondee projects, even though they are likely to encounter similar problems, and insights gained along the way by Secondees are of potential benefit to their peers. On this basis, it seems

appropriate to view CIPeL Secondees and those who support them as an emergent Community of Practice (CoP) (Wenger 1998a).

The collaborative aims between teams and communities of practice differ in important ways. McDermott simply defines a CoP as 'a group that shares knowledge, learns together, and creates common practices' (McDermott 1999: 3). Wenger contrasts teams and CoP as follows: 'In their teams, they take care of projects.… A community of practice exists because it produces a shared practice as members engage in a collective process of learning' (Wenger 1998b: 4).

One of the isolating factors for CIPeL Secondees is that they are busy academics with little time to spare for non-essential tasks. This makes arranging face-to-face community meetings problematic. In order to overcome this hurdle, the idea of an online community space was proposed, which would enable members to meet virtually, as well as asynchronously. Apart from giving Secondees the option to have additional online meetings with members of their support team, this online space is primarily proposed to provide a meeting place for the CIPeL community as a whole. The online site is a password protected space, accessible only to members of the CIPeL community (and on occasion, invited guest). It thus proves a safe and secure place for making early versions of interprofessional LOs available to the community for viewing and for giving members the opportunity to offer feedback.

However, visiting this online space remains an optional extra for members and hence it is unrealistic to expect that online participation will simply happen. Therefore, how might online participation be encouraged? How could one get to the stage where there is a critical mass of participation that ensures the site's status as a worthwhile place to visit? In the early stages of the CIPeL Community site project, this seemed the most urgent and the most difficult question to address. Various strategies were used to encourage participation, such as opening up the site to CIPeL staff first, enabling and inviting them to seed discussion topics, promoting the site during face-to-face CIPeL events, sending out invitations to community members via email and seeking to create an online space that has a clear structure, is user-friendly, offers relevant content and provides a range of opportunities for member to contribute.

2.2 Structure and usage

The CIPeL community site makes use of Coventry University's Virtual Learning Environment (VLE), the Vista Enterprise Blackboard Learning System™. This ties access to the Community site to a software environment most members use on a daily basis for teaching purposes. Fig. 1 shows the Homepage of the CIPeL Community site. It provides entrance points to various sections of content and activities. It incorporates an image of members at a CIPeL event; this is an attempt to 'personalise' the space and explicitly link it to its intended audience.
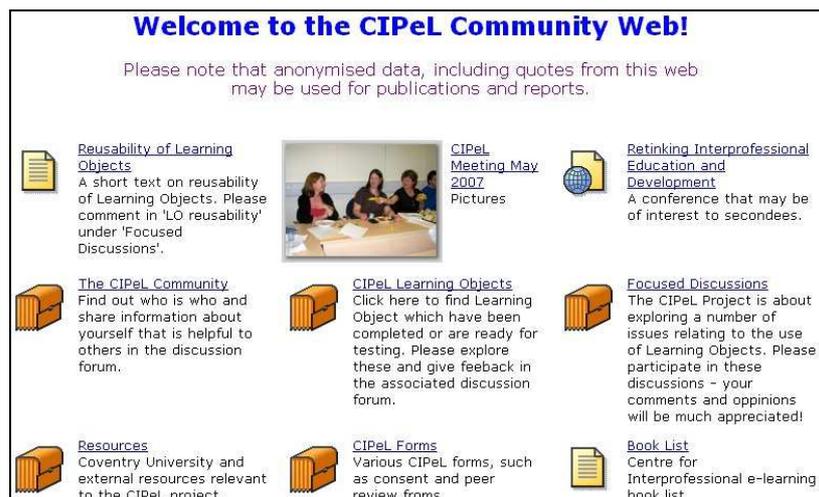

Figure 1: The CIPeL community homepage

The CIPeL Community site, including its Homepage, evolves and changes over time. Some of the items it contains are regarded as key elements, such as:

- **A page for holding CIPeL Learning Objects**: This page contains a growing list of links to early versions of interprofessional LOs which have been produced for CIPeL. Each LO is associated with a dedicated discussion forum where members of the community can comment on the LO and offer suggestions.

- **A page for holding information about members of the CIPeL Community**: Since members are geographically dispersed and largely employed on a part-time basis, an important function of the site is to help members know who else is in the community and what role they play within it. All new members are invited to introduce themselves, using a discussion forum. The page includes a link to the CIPeL's website which is itself evolving. The website provides details about staff who are involved with CIPeL, including their role, and where applicable, a brief summary of their project.

- **A page for focused discussions**: This contains links to a range of separate discussion topics, each focused on an aspect of LO design or use. These discussion topics are aligned with research questions taken from CIPeL's research and evaluation strategy (CIPeL 2006).

Items which were either added to the CIPeL Community site at a later stage or seemed more peripheral at the design stage (but see conclusions drawn in this paper!), include:

- A report on recommendations for structuring LOs with the aim of increasing reusability

- A list of conferences that may be of interest to CIPeL users (updated monthly)

- Links to relevant Internet resources

- A reading list of articles and books relevant to the community

- A list of links to assorted CIPeL documents and forms

It is surprising how dynamic CIPeL's affairs are; nothing stays still for any length of time. New Secondees join, new projects are taken on board, members of staff may leave and others join. Meetings are held and decisions are made, new documents and guidelines are produced or are under discussion. Progress is made on individual Secondee projects and so is work on setting up the repository. Mile stone events, such as the CIPeL Repository Launch, held at on 26th November 2007 at Coventry University, are prepared for, come and then go, leaving ripples behind. Hence it is only possible to provide a snapshot of CIPeL relating to a specific point in time.

With the question of participation in the CIPeL Community site in mind, some of the available online tracking data was explored in order to gain a broad picture of usage. The data was collected on 1st August 2007, when the total number of users registered on the site was 64. This included some guest accounts. At that time, the online space had not existed for very long. The site had been made available to CIPeL core staff in January 2007, and Secondees were given access from early March 2007 onwards. The following figures emerged from the tracking data:

- 29 of a total of 64 user had never accessed the site

- The remainder had accessed the site an average of 6 times

- The total number of discussion postings read was 1389

- The total number of discussion postings sent was 87

- Web links had been followed up a total of 60 times

- Folders had been visited a total of 667 times

- Files had been accessed a total of 255 times

A cursory glance at these figures shows that the number of discussion postings is low, while in contrast, most of the other figures are comparatively high or even very high. Invitations to post to discussions had included a range of options. Members who were new to the online space were invited to introduce themselves online. They were invited to look at available versions of CIPeL LOs and then offer comments. Finally, they were asked to contribute to a number of discussion topics focusing on research questions of relevance to the CIPeL. The discussion topics associated with Learning Objects scored very low in terms of postings, some of the theoretical discussion topics did rather better, but the most frequently used topic related to personal introductions by members.

2.3 Exploring factors that influence participation

In June 2007, a questionnaire had been used in order to probe underlying reasons for online participation in the CIPeL Community site. The questionnaire was developed using SurveyShare™. It was sent out via email to 44 members of the CIPeL Community and recipients could complete it anonymously and online. Ten questionnaires were returned. The questions were designed to explore members' attitudes in relation to interprofessional learning and the usefulness of introducing LOs into mainstream teaching practice. If there was a lack of interest in these areas, then participation in the Community site was unlikely to be of interest. A key question aimed to uncover what percentage of work time a member was able to devote to his or her CIPeL project. Clearly, if the time factor was very low, then it would be unlikely that optional online participation would be a priority for them. Other questions were designed to probe members' reasons for visiting the online space. Hence the survey used one set of questions aimed at uncovering whether an individual's contextual conditions were such as to rule out likely participation and a second set of questions which explored more narrowly what kinds of local conditions or reasons made participation likely. The questionnaire contained 10 questions, covering the following issues:

1.   What percentage of time people were able to devote to CIPeL

2.   Whether members saw interprofessional learning as an important agenda

3.   Whether members thought the use of LOs would increase in importance in the future

4.   The importance they attributed to technical support for their project

5.   The importance they attributed to peer support in relation to their project

6.   The importance of access to pedagogical advice in developing and using LO's

7.   Their views on the aim and purpose of the CIPeL Community Site

8.   What kinds of support they would like within CIPeL that is not currently available

9.   What their key insights are after participation with CIPeL

10. What challenges they see regarding the development and use of LOs

It would clearly have been desirable to have more responses to the survey. However, the responses received, coupled with the tracking data, proved really useful to the author. Some questions required a five-point Likert scale response, where the options were: Strongly Disagree, Disagree, Undecided, Agree, Strongly Agree. The survey responses may be summarised up as follows:

(1) Three people indicated that they gave 0-5% of their time to CIPeL. Five participants devoted between 6 and 25% of their time to CIPeL. Two others gave between 50 and 100%, which suggests that they are CIPeL core staff.
[Response options were: 0-5%, 6-10%, 11-15%, 16-20%, 21-25%, 26-30%, 31-50%, 51-75%, 76-100%]

(2) Eight people agreed or strongly agreed that the interprofessional learning agenda was important, but two were undecided about this.
[Likert scale responses]

(3) Nine respondents indicated that they believed that Learning Objects would increase in importance in the future, but one was undecided.
[Likert scale responses]

(4) All participants agreed or strongly agreed that technical support is important.
[Likert scale responses]

(5) Six respondents agreed and four strongly agreed that peer support is important.
[Likert scale responses]

(6) Six respondents agreed and four strongly agreed that pedagogical advice on the development and use of LOs is important.
[Likert scale responses]

(7) Responses to the question about the aim and purpose of the CIPeL Community site strongly echoed the reasons for which the site was set up.

[Free text responses]

(8-10) Responses to the final three questions indicated that in general, participants found the task of creating LOs challenging, that they found it more difficult than anticipated and that they would welcome more support than they were actually receiving.
[Free text responses]

At this point, it is worth noting that responses indicate that all forms of support were generally welcomed, including peer support. Responses to the question as to the aim and purpose of the CIPeL Community web echoed most of the reasons for which it had been set up. These included 'discuss and exchange ideas', 'share experience and expertise' and 'share and learn from each other'.

3. Discussion

The fundamental research question addressed in this paper is how an emergent CoP might be nurtured and supported. The assumption was made that the provision of a dedicated, well-structured online space would provide a basis for community growth and development, achieved through participation and knowledge sharing of its members. This brought into focus the narrower question of how members of the community might be encouraged to participate in online discussions. There was a belief that if this could be achieved, then this emergent CoP would be strengthened, to the benefit of all concerned. For example, it was hoped that this would have the potential effect of helping Secondees progress more smoothly and more quickly with their respective LO projects and that the accumulation of insights relating to LO construction and use would shed light on some of the theoretical questions of concern to CIPeL.

Wenger's (1998a) Community of Practice theory of learning appears to offer conceptual tools to help make sense of how CIPeL Secondees and those who work with them function as a community. Furthermore, the application of the CoP theory to this context holds out the promise of opening up a vision for a way forward in supporting members of the community more effectively, helping them become a more cohesive community with a shared practice and a shared repertoire (Wenger 1998a: 82) of communal resources.

The concept of 'peripheral participation' (Lave and Wenger 1991: 29, Wenger 1998a: 100) relates to newcomers in the community, who learn the details of engaging in the practice from more established members, particularly where situations are ambiguous or unusual. Each new Secondee represents a newcomer in relation to the CIPeL community. As academic members of staff, they are likely to have engaged in online teaching and are also likely to have produced online materials for the courses they teach. However, it is unlikely that many have focused on the issues surrounding re-usable LOs, because this has not previously been a requirement. Of course, there are Secondees who have already completed their project, but they have no obligation to work with newcomers, whose projects, in any case, are likely to be very different from their own. Hence, the newcomer does not have the luxury of being able to draw on an established community of practice to guide them in their task.

The need to identify and incorporate new insights into well-rehearsed ways of working is very much present in an established CoP (Wenger 1998a). However, the *emergent* CoP needs to have a stronger focus on garnering and refining new knowledge, gained by members on the basis of engaging in tasks relating to the new domain of practice. This was one of the main reasons for setting up an online community space for the group: to enable all members to share emergent knowledge and insights in relation to the CIPeL's enterprise.

Wenger (1998b) has explored the development phases of communities of practice in some detail. He names five stages of development: *potential*, *coalescing*, *active*, *dispersed* and *memorable*. Potentially, all of the first three stages apply to some degree to CIPeL as a CoP. Ambiguity is due to the fact that new members are joining this community over time comparatively frequently and that some members, but not all, already know each other from another context. According to Wenger (1998b), typical activities for a CoP at the *potential* stage include 'finding each other' and 'discovering commonalities'. At the *coalescing* stage, we are looking at 'exploring connectedness, defining joint enterprise, negotiating community'. At the *active* stage, there is 'engaging in joint activities, creating artifacts, adapting to changing circumstances, reviewing interest, commitment and relationships'. Most of these activities seem to be happening concurrently within the CIPeL community, but perhaps the degree to which they are present needs to be stronger.

One obstacle which stands in the way of achieving the *coalescing* and *active* stages more fully lies with the fact that Secondees as well as critical readers have many other commitments, through being members of other communities of practice. Wenger (1998a, 1998b) emphasises that it is common for people to belong to multiple communities of practice. The fact that Secondees have chosen to work with CIPeL signals their interest in developing an interprofessional LO. But restrictions on the time available to them during which they can devote themselves to this task limits to what extent they are able to engagement with the associated community of peers. The time pressures are such that Secondees are often hard-pressed simply to find time to focus on their CIPeL project. Therefore, engaging with the CIPeL community, over and above involvement with their project, becomes a low priority.

A second conceptual tool from the CoP theory to be considered is that of a 'reified object' (Wenger 1998a). By way of a shortcut, the following quote may stand as a definition:

> *I will use the concept of reification very generally to refer to the process of giving form to our experience by producing objects that congeal this experience into "thingness". In so doing, we create points of focus around which the negotiation of meaning becomes organized. Again my use of the term reification is its own example. I am introducing it into the discourse because I want to create a new distinction to serve as a point of focus around which to organize my discussion. Writing down a law, creating a procedure or producing a tool is a similar process. A certain understanding is given form. This form then becomes a focus for the negotiation of meaning, as people use the law to argue a point, use the procedure to know what to do, or use the tool to perform an action. (Wenger 1998a: 58)*

The existence of reified objects in a given domain, similar to the notion of peripheral participation, implies that the CoP has existed for a reasonable period of time. It implies that there has been time for the community to have formalised key elements of a work process, for example, through the creation of input forms or templates (Deepwell and Courtney 2007). These reified objects have the power to help participants make decisions in line with current practice and generally provide orientation and guidelines.

Focussing on this aspect of a CoP, it becomes clear that reified objects are a key ingredient of effective practice in a professional domain. An emergent CoP is hindered in its practice by the fact that the practice has not been established long enough to allow for the development of a sufficient number of reified object to emerge or that existing reified objects are not sufficiently refined to help guide domain-level actions.

Could it be then, that encouraging and supporting an *emergent* CoP needs to be more concerned with the task of accelerating and refining appropriate reified objects and that communication and exchange of ideas cannot realistically be expected while the availability of reified objects is sparse? One of the responses from the survey appears to express frustration at the lack of reified objects:

> ***Question:*** *"Following your participation in CIPeL, what are your key insights with regard to the creation/use of LOs?"*
>
> ***Answer:*** *"Lack of understanding of the dilemmas and decisions required to create an LO. …The need to debate the definitions of LO."*

Key phrases here are 'lack of understanding', 'dilemmas and decisions' and the demand for a debate on the definitions of LOs. Why should definitions matter? The answer is that a definition of LOs provides essential guidance to the person who has taken on the task of building one. Some commonly accepted definitions may not be helpful for the purpose of guiding the construction task. For example, Wiley's widely quoted definition of an LO as 'Any digital resource that can be reused to support learning' (Wiley 2000: 7), and indeed the definition broadly embraced by CIPeL, enables us to decided whether a given object may be classed as a LO, but it has little generative power for guiding LO design. This survey response encapsulates a plea of some intensity for more orientation, more help and guidance, in order to be able to sensibly address the task that of creating a LO.

It now becomes apparent that the tracking data suggests a similar story. Members who have visited the CIPeL Community site have posted comparatively few comments, but they seem to have been very busy reading any available discussion postings, and they have shown considerable interest in the CIPeL documents presented online. Does this indicate a search for information, for gaining insights as to what others do in this domain, for hints as to what might be expected behaviour, and so on? It may be unreasonable to expect contributions to discussions in the context of an environment that is characterised by uncertainty and a lack of orientation.

This analysis suggests that it is extremely worthwhile to focus on guidelines, strategies and accepted definitions, in fact any document that contributes towards the process of streamlining the selection, support, quality assurance aspect and evaluation of Secondee projects. These documents, if provided in sufficient numbers and sufficient detail, will help the Secondees to progress while avoiding unnecessary searches and false starts. The need to present forms and guidelines coherently to Secondees has been address in the creation of a Secondee handbook that places key CIPeL documents under one cover. This is an effective way of ensuring that Secondees are aware of available guidelines and who they can turn to for support or advice.

However, the problem is that there remains much that is of relevance to Secondees that is either tacitly assumed or stated in documents that do not intercept the workflow. There are so many really big questions that come into play for the Secondee. What is a Learning Object? What makes an LO interprofessional? Explanations which satisfy people in a general sense may prove of little use when it comes to the task of constructing LOs.

What we are discovering here is that the problem with emergent communities of practice is that the reified objects which would normally guide activities at the domain level are themselves still under construction. This is akin to having to work at the domain level and at its meta level at the same time. It is difficult to guide the construction of interprofessional LOs, because the meta level, containing the community's reified objects, is still sparsely populated at this stage and remains incomplete.

This line of inquiry suggests that emergent communities of practice need to focus on the creation and refinement of practice-specific reified objects. It is not easy to know what these objects may look like. Forms and guidelines have already been mentioned. Fortunately, there is an available source of reified object even in an emergent practice, in the shape of examples of existing objects at the domain level. This is widely recognised, and accounts for the demand and popularity of examples of 'best practice'. Others can learn form such examples, abstract essential features and use these to guide actions in their own sphere of work.

For CIPeL, this means that all existing CIPeL LOs have a dual purpose. The first is that they function as an interprofessional LO and thus support interprofessional learning. However, when used as a reified object, they can inform the LO construction process itself. This represents learning from example – potential designers will be quick to grasp essential features of a sample LO that may be replicated in a modified form.

An interesting point to consider is that the LOs which are produced by the CIPeL community represent reified objects in the context of interprofessional learning. The LOs are used to help students understand what interprofessional practice means. This suggests that there is a close relationship between the concepts of an LO and that of a reified object. The nature of this relationship cannot be pursued here, but emerges an interesting topic for future research.

It is also possible and worthwhile to draw parallels between the CIPeL community as an emergent CoP and the much larger domains of interprofessional practice and interprofessional education. IPP is an emergent practice, a fact which is very much reflected in the literature. The number of newcomers to IPP is large; it does not just encompass students and newcomers to health care as such, but includes many who are currently practicing in a health care capacity. Multiple theories of learning have been invoked (Colyer, Helme and Jones 2005) in the attempt to impose structure on this large and complex domain and help us understand the task of transforming patient care to meet IPP criteria and standards. However, Wenger's (1998a) CoP theory surely needs to take pride of place, since it addresses issues so central to both IPP and IPE, given its focus on how people work and learn together, while highlighting shared practice and the key role of reified objects.

4. Conclusions

This paper traces an attempt to support CIPeL Secondees and those who work with them towards forming a CoP for the mutual benefit of its members, via the provision of an online CIPeL Community site. In this account, the underlying questions have shifted from "How can an emergent CoP be supported?" to "How can online discussion and participation be encouraged" and then onto "What do reified objects look like with respect to the CIPeL CoP and how can some of these be constructed?"

Somewhere along the way there was a suggestion that perhaps it was naïve to expect online discussions from members, in the absence of what turn out to be key orienting features for any CoP, namely a sufficient

number of reified objects relating to the practice. It feels very much like a chicken and egg thing: it seems we cannot have one without first having the other, and vice versa.

In his book 'Communities of Practice', Wenger (1998a) strongly emphasises what he calls the complementarity of participation and reification:

> *Participation and reification cannot be considered in isolation: they come as a pair. They form a unity in their duality. …..To understand one, it is necessary to understand the other. To enable one, it is necessary to enable the other. They come about through each other, but they cannot replace each other. It is through their various combinations that they give rise to a variety of experiences of meaning (Wenger 1998a: 62).*

This line of inquiry has brought into sharp focus the importance of the role reified objects pay for communities in an emergent field of practice. Identifying different types of reified objects and the exploration of ways of speeding up the construction of such objects in an emergent field of practice are now viewed as important questions for future research. Examining domain-level objects for their value as a reified object presents itself as another urgent task. For CIPeL, this means taking a careful look at the interprofessional LOs currently in its collection. Some of these, for example the patient journeys, exist as a set of LOs made to one underlying format. But there are other objects, less easy to replicate with new content perhaps, that need to be explored for their potential value as a reified object.

It has further been suggested that the CIPeL experience recounted here may have parallels in the wider contexts of both IPP and IPE. There is no space to explore this further here; this must be left as a question for future research.

Above all, it is felt that the conceptual tools embodied in the Community of Practice theory of learning offered by Wenger (1998a) and Lave and Wenger (1991) have proved extremely useful in making sense of a rather complex scenario. Further explorations along similar lines seem well justified.

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Issues Around Creating a Reusable Learning Object to Support Statistics Teaching

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Abstract: Although our health professional students have some experience of simple charts, such as pie and bar, and some intuition of histograms, they do not appear to have much knowledge or understanding about box and whisker plots and their relation to the data they are describing or compared to histograms. The boxplot is a versatile charting tool, useful for presenting data from surveys and any other projects, where a reasonable quantity of data has been collected.

An opportunity arose to create a reusable learning object (RLO) to describe, explore, and interpret boxplots, especially in relation to their data and summary statistics. Examples included interprofessional learning, as this was the main remit of the Centre for Excellence in Teaching and Learning, from which funding was obtained. The RLO is aimed at both undergraduate and post-graduate HP students, who would be able to use the resource flexibly, to augment their limited exposure to statistical techniques, and add to their appreciation of IP learning and working.

The RLO includes animation and opportunities for students to interact with the resource. Existing, available 'real' data, collected as part of research projects concerning (IP) learning, as well as generated data, is used as illustrative material.

This paper explores some of the issues raised during the creation of the RLO, and presents limited feedback from users. Issues raised include the working of the project team, delivery platform, copyright and intellectual property rights and software incompatibilities. To date, feedback from colleagues and students has been very positive and has encouraged further improvements.

The creation of this RLO has been a longer and more time-consuming experience than anticipated, and has highlighted the importance of a team approach, with constant reviewing. It will be interesting to see how the RLO will be used, and usage will be evaluated in the future.

Keywords: Reusable learning object, Box and whisker plot, Boxplots, Interprofessional learning

1. Background

There has been a long tradition of teaching statistics as part of the mathematics curriculum in schools and colleges, in terms of routine calculation of averages and drawing various charts, but it is questionable whether this forms an effective basis for future working and studying (Meletiou-Mavrotheris and Mavrotheris 2007). In higher education for non-statisticians, for example health professional (HP) students, little of this previous learning appears to translate into skills to aid reasoning, appreciation and interpretation of the results of research projects, necessary for their studies and to provide evidence to inform practice. In addition, for students following a health professional course at Master's level, in my own institution there is only a small amount of time available in a very full curriculum to devote to data analysis, so use of e-learning was considered as a way forward to supplement classroom teaching.

Although use of e-learning can provide a flexible and additional way of studying, it does require time and effort to produce good, informative resources, so when an opportunity to fund some of the costs involved in the making of a learning object (LO) arose, this seemed to be an ideal subject area to consider. Funding was made available in the UK by the Higher Education Funding Council for England to set-up several Centres for Excellence in Teaching and Learning (CETLs). The main aims of the CETL initiative are to reward excellent teaching practice and to deliver substantial benefits to students, teachers and institutions (HEFCE 2005). This is arguably one of HEFCE's most ambitious initiatives, due to the subject spread of the Centres, the light touch approach adopted to monitoring and the substantial funding to 74 centres across England over a period of five years. The particular centre supporting this project encourages and assists the creation of LOs linked to Interprofessional (IP) learning, so there was a need to include an aspect of this in the LO. IP working and learning are of prime importance in current HP education due to the perceived desirability of improved teamwork, communication and collaboration, all found wanting in the recent past (CAIPE, founded 1987; Bristol Royal Infirmary 2002; Laming 2003). "*Interprofessional education occurs when two or more professions learn with, from and about one another to facilitate collaboration in practice*" (CAIPE 1997).

There is widespread debate, as to what precisely constitutes a LO (Moisey *et al* 2006; Or-Bach 2005; Parrish 2004; Boyle 2003; Polsani 2003). Two commonly quoted definitions are: "*a digitised entity which can be

used, reused or referred to during technology supported learning" (Rehak and Mason 2003), or "*any digital resource which can be re-used to support learning*" (Wiley 2003). The LOs can be stand-alone resources for an extra, more in-depth learning opportunity for skill acquisition, or 'triggers' for developing and expanding knowledge (Davidson and Courtney 2004). The key is in their ability to be used more than once to support learning, thus forming reusable LOs (RLOs). The extra appeal of using a digital resource over yet another paper handout is the ability to include activities, providing interaction via the computer between student and material to make a more engaging learning experience (Ally 2006). Of course, it does mean that access to a computer is required.

Health professional (HP) students, involving qualified physiotherapists, occupational therapists, nurses, midwives, dieticians and acupuncturists, following a Master's degree in this university can study several research modules, including one exploring and doing data analysis. The first session of the quantitative part of this module looks at descriptive statistics. This classroom-based session assumes some basic knowledge of descriptive statistics, for example, an understanding of averages, measures of spread and simple charts. Personal experience has shown that, while our students have some knowledge of simple charts, such as pie, bar, and histograms, they do not appear to have much understanding of 'box and whisker' plots (or 'boxplots') and their relation to the data they are describing, or compared to histograms. Many of our students are 'mature' and, hence, although these topics may be covered in the current national school curriculum, they may not have been exposed to this topic before. This provided an additional need to produce supplementary learning material around the topic of boxplots, which could be used in a flexible way, as, in teaching sessions, there is often insufficient time available to do justice to many aspects of this useful chart, including interpreting and drawing conclusions, rather than just constructing the chart using appropriate software, for example the Statistical Package for Social Sciences (SPSS) (Pfannkuch 2006).
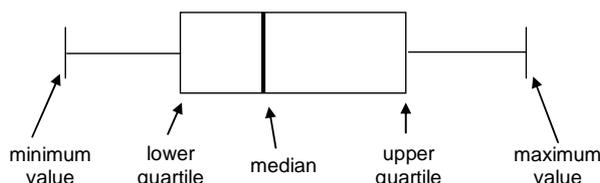

Figure 1: A simple diagram of a boxplot

A boxplot is a pictorial representation of a dataset, showing the minimum and maximum values of the dataset, and also the median, lower and upper quartiles. Figure 1 shows a simple horizontal boxplot. The boxplot is a versatile charting tool, useful for presenting data from surveys and any other projects, where a reasonable quantity of data have been collected.

Thus, the aim of this project was to create a RLO, which describes, explores, and interprets boxplots, especially in relation to data and summary statistics, with links to IP learning. The material is aimed primarily at post-graduate HP students, who would be able to use the resource flexibly, to augment their limited exposure to statistical techniques. It would also draw on some of the wealth of material available online to support a more in-depth look at boxplots (Hunt & Tyrrell 2005; Education Queensland 1997). It was considered that interested undergraduate students, following an evidence-based module, would also find the resource useful. This paper outlines some of the issues raised in the creation, and some evaluation, of the boxplots explored LO.

The particular link to IP learning was established by using a figure containing a boxplot illustrating HP students' attitudes to IP learning (Pollard *et al* 2004). Many of the Master's students provide mentorship to undergraduate students when on placement, and thus are involved with IP education, as well as IP working. It was thought that this would provide a supplementary view on their IP learning. This link to IP learning does, however, limit use of the LO, although it is anticipated, that other disciplines could substitute content with their own relevant examples. In this, the LO can be considered as a RLO for exploring boxplots, plus the learning activity with a discipline link, to provide a unit of learning (Jones 2004; Koper 2003).

2. Project objectives

It was intended that the LO would have basic information relating to boxplots; for example, definitions, interpretation of differently-shaped plots and their relation (comparing) to a histogram, another more commonly understood chart. There would also be self-tests and an application to IP. Finally links were made elsewhere, as, although LOs are designed to stand-alone, it was thought that links to further resources, for example web-sites, would encourage broader exploration, and provide additional opportunities for learning.

Overall, there was an intention to make the LO interesting and informative, thus promoting a desire to use it fully.

Having agreed project funding, and 'buy-out' from main work, the following steps were taken:

- A project team was established
- A time scale was proposed
- A delivery vehicle was agreed
- Existing material was reviewed
- Additional resources to augment existing material were gathered
- Communication with allocated learning technologist was established
- Content was created and reassessed regularly
- Content was critically appraised
- Metadata was added and placed in the repository (CURVE)
- The LO was piloted
- An evaluation and peer review took place
- Dissemination of the project experience and its use was monitored

Production of the RLO has been reviewed continuously and, although production began with existing material, elements and, particularly presentation, have evolved throughout the progression of the project. Struthers (2002) provides some useful insights into developing materials for online use, which can be applied to creating LOs, covering points around team building and working, and product development matters. She stresses the importance of the wide range of skills that are required to build online materials, offered by learning technologists (LTs) and subject specialists.

3. Issues

This section discusses some issues arising while the 'boxplots explored' RLO was being created.

3.1 Project team

The project team consisted of a member of the funding group, who was knowledgeable about IP, a LT, who had software experience, and the LO creator. Half a day a week was allocated for approximately 20 days for the project. It was intended that the time would be taken on an ad hoc basis, rather than exactly as prescribed. Regular meetings were arranged between the creator and the LT. At the first of these meetings the delivery vehicle for the LO was decided.

3.2 Access to the LO

The University uses Blackboard General System^{TM} as its virtual learning environment (VLE) and teaching staff can use Wimba Create (WC, formerly Course Genie®) to create web pages from Microsoft (MS) Word® documents (Wimba 2007). WC also allows academics to edit, update or repurpose content. The creator was experienced in using WC, so that was chosen, for delivery via the VLE. Another positive aspect of using WC is that it includes an accessibility checker, enabling content to be checked for compliance with the Disability Discrimination Act (1995), updated in 2005 (TechDis 2007). However, the WC choice did pose some difficulties for the graphical aspects, including diagrams and interactive sequences. The University is currently developing a repository (CURVE), allowing alternative access to LOs, outside the VLE.

3.3 Content planning

Course content was planned with a 'storyboard'. This can take the form of an initial outline (see Figure 2) of the content and navigation, then filled-out in more detail and checked for accuracy, ease of understanding and where any activity, and in what form, might be incorporated. Working with a storyboard is a vital step in the production of e-learning materials, enabling logical routes and linking through the web pages to be explored. The design in this case was sequential, although pages were indexed, so that a user could return to any section at any time. It is time-consuming and indirectly expensive to keep returning to pages and editing at a later date, so it is very worthwhile to spend time at this stage. This was a lesson to the creator

enhanced with hindsight. Also, at the initial stage, it is vital to consider the audience for which the LO is intended, what content is desired and what resources will be required, including animation, use of audio and video.
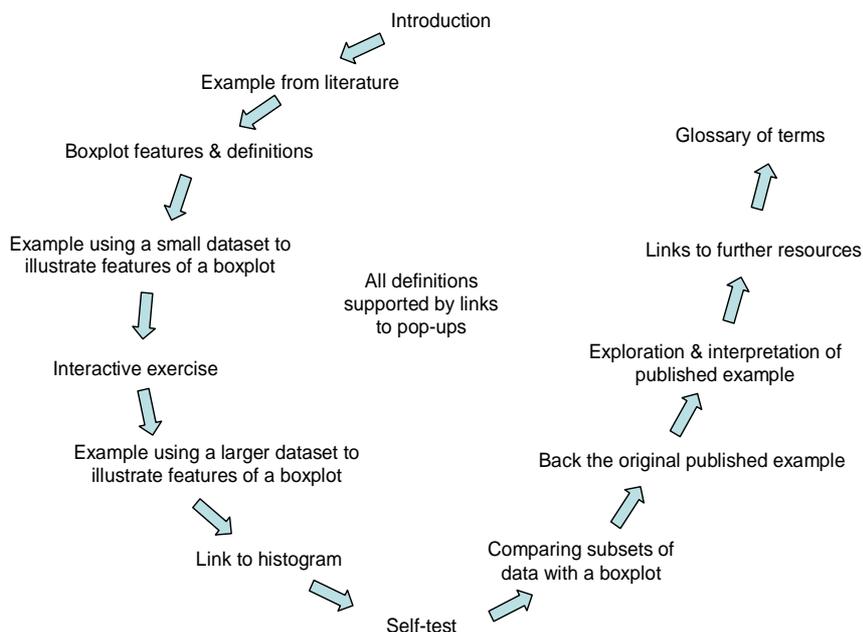
Introduction

Example from literature

Boxplot features & definitions

Glossary of terms

Example using a small dataset to illustrate features of a boxplot

All definitions supported by links to pop-ups

Links to further resources

Interactive exercise

Exploration & interpretation of published example

Example using a larger dataset to illustrate features of a boxplot

Back the original published example

Link to histogram

Comparing subsets of data with a boxplot

Self-test

Figure 2: Outline of 'Boxplots Explored' learning object

3.4 Copyright

To introduce users of the LO to a boxplot, a chart published in a journal was given as an initial example (Pollard *et al* 2004). At first, it was desired to include the published paper as a file in portable document format (pdf). This, however, involved copyright issues, as, although the chart had been created in-house, copyright had been handed-over to the journal publisher on acceptance of the paper, which included the chart, for publication. Under the Extended Copyright Licensing Agency Higher Education trial licence scheme any member would be able to freely download the paper, but once again, wide reuse of the LO would be compromised, as not all potential users would be members of the scheme (CLA 1982). An alternative would be to apply to the copyright holder for permission, but often this is a costly route. A decision was taken to reference the paper and use a digitised version of the chart in the LO.

Copyright must be considered not only from the aspect of using existing material, whose copyright may be owned by another party, but also the creator's own, and institutional, copyright and intellectual property rights (IPR), when developing resources for others to use. Most universities and IT services have policies relating to these issues, and need to be explored. Further useful sources of information can also be found online (JISC Exchange for Learning (X4L) Programme 2002 - 2005). CIPeL has its own copyright agreement.

3.5 Pop-ups

The next step in the LO, was a page illustrating the main features of a boxplot, with definitions of terms available via 'pop-up' windows. Pop-ups provide links to information, often displayed in a small window over the screen, which is currently being viewed. They can be displayed and closed when finished. This application of pop-ups is not to be confused with the extensive use for advertisements on the web, which can be annoying, and, hence, browsers offer the option to disable pop-ups. Novice users need to be alerted to this, so that they can enable pop-ups when using the LO. Definitions in the pop-ups were gathered together and displayed as a glossary page, with a link to a printable version for users to take away.

3.6 Presentation

This definition page became very 'busy', and was considered to be too much to absorb at one time. Consequently, the content was reassessed, and became two pages. Figure 2 shows some of the initial content. This is where the choice of WC became a problem, in that it was not possible to create the image within WC, although programming with Macromedia Flash® enabled its accommodation (Macromedia 2007).

There are two issues needing consideration here. The first is in being very clear about what content is required. It is considered important that the technology does not drive the learning resource (Walker 2003), but a balance is sometimes needed between what is familiar and easily available with desired output. The second issue is that of communication between creator and LT/programmer. In general, the LT will not be familiar with the content of the LO, so that what may appear very clear, logical and straight-forward to the creator, may be interpreted differently by the LT, and hence, for example, different emphasis may be placed on the various elements of the LO. The use of Flash® may also limit the accessibility by some students with less powerful personal computers.

3.7 Content detail

Existing teaching ideas and materials were available, so it was important to review these, edit and supplement where necessary. A dataset consisting of students' heights (cm) along with gender had already been created, so a small set of similar data was set-up to illustrate the calculation of some statistics illustrated in the boxplot, such as median and quartiles (Figure 1). This was presented as questions, with illustrated answers available via pop-ups.

The next stage of the LO introduced the larger data set with comparisons of boxplot and histogram charts. These charts were created in SPSS v14, which imposed limitations on their presentation, due to restrictions in editing them in SPSS (SPSS 2007). Another factor constraining the presentation was the screen size available for display on most monitors.

3.8 External resources

A self-test comparing boxplots and histograms was adapted from the excellent Exploring Data website from Central Queensland University (Education Queensland 1997), providing interactivity. It is considered important to have some interactive elements in a LO to involve the learner in the learning process (Lander 1999, Rehak and Mason 2003). Another small Flash® movie was embedded into the LO to emphasise the connection between and boxplot and histogram of the same data.

3.9 Interprofessional example

After all this exploration of the charts, the attention of the user was drawn back to the IP aspect of the LO. The published chart was taken from one of a series of papers from a longitudinal study looking at attitudes of HP students to IP learning at the beginning of their course (Pollard *et al* 2004). Their attitude was measured using a validated scale consisting of several items with responses measured on a Likert scale, giving an individual, overall score for the all the students taking part. As well as seeing an application of a boxplot, it is intended that the students will gain more insight into IP education and working.

3.10 Other links

The final sections provided a glossary of terms for reading and/or printing, and links to other resources, including warnings that new windows would open and instructions to close windows after use. In WC it is possible to create an 'Include', which is a 'taster' view of the web address of interest, showing the actual web page. Used judiciously, this is an excellent lead into further sources, enticing the user to explore further. It must be remembered though that any links included need to be checked regularly to ensure they are still active.

3.11 Expected usage of the tool

From a pedagogic point of view, the LO had always been expected to be used as optional, additional teaching material, to be used flexibly by the student. It aimed to supplement classroom teaching, pooling ideas from other sources to maybe simplify, but not replace, the reading around process. Often it appears that busy, part-time students do not always find the time to explore additional material, and this LO has not been used as often as expected. However, some of this is due to the late of completion of the LO and its availability in their course.

It also has to be remembered that users of an online resource will, in general, be working alone and not be able to get answers to questions by 'putting their hand up'. To overcome this, a high level of support needs to be built-into the resource. Anticipating areas of potential difficulties may be problematic for a creator who is familiar with the subject, and this is where external feedback from reviewers can be vital. Of course, the

creator may well have experienced 'frequently asked questions', answers to which can be incorporated into the LO.

3.12 Review and evaluation

To date, the LO has been reviewed by colleagues, who teach and use statistics, with a favourable response to the content. Valuable suggestions to improve some of the detail and presentation of content were made and have been incorporated. Most recently, a colleague with online learning expertise has also viewed the learning resource, and made suggestions for its use as a RLO. This highlighted the need for external review, as, although the LO worked well as a supplement to the original teaching session, it would not stand-alone without prior learning, and some more definitions. It was decided to place a caveat on the first page, outlining necessary prior knowledge, in addition to the potential user. To include the necessary information in the current activity would increase the length of the LO, plus, as this knowledge is widely available elsewhere, it could be acquired relatively easily. Indeed, some undergraduate students used the LO before discussion had taken place around different charting tools, and only thought it useful after some preliminary dialogue.

There has been limited evaluation by Master's students, as the LO has only just been completed towards the end of the last run of the data analysis module, for which the LO was created to supplement. However, so far, response has been very positive, and it is hoped that a more formal evaluation will take place in 2008. Some informal comments received so far regard the use of one of the visual elements "*I LOVE the visual demonstration of the boxplot v histogram*" and a dyslexic student has commented that he finds it easier to "*assimilate information given in this way*", ie via a computer screen, and wanted more of it please! Another student picked it up at the end of the module during revision and found it "… *was useful to go through some really basic definitions which is the starting place for most stats work although some really basic stats knowledge was needed initially*", and she "*would still like more interpretations of information (with answers!) so that we know that we are on the right track*". This last stresses the importance of earlier comments relating to using the resource for self-study when alone. A more recent student user reported that "*I found it very useful & will definitely refer back to it in the future. I liked the 'test yourself' aspect too – good to check if it really has sunk in!*". She also liked the pop-up definitions.

As students use the LO, they will be asked to complete a questionnaire, provided by the CETL, covering general aspects of the RLO, such as ease of use, access issues, technical problems, helpful to learning. This will provide good feedback for the CETL, and some insight for the boxplot LO. However, it will also be important to find out if the LO has been successful in adding to the student's understanding of boxplots. There will be several different groups of students who will have access to the LO, and it is hoped to expose them differently to the LO. A short multiple choice test, relating to interpretation of information from a boxplot, has been developed, which will be used differently, depending on the mode of study of the students. For example, there will be time available for one of the groups studying at Master's level to take the test, use the LO in the classroom, and then to re-take the test. Another group will study the LO out of the classroom without tutor support available. It is hoped there will be a high proportion of involvement from these students. It may also be possible to arrange for volunteer students to work through it in a 'usability lab' where they are videoed. Both the student and their onscreen activities are recorded, so that it can be seen where they are having problems, or, hopefully, at what point they grasp the concepts and show understanding.

Undergraduate students' learning will be more difficult to establish, as the LO will be one of many extra tasks they will be encouraged to explore.

3.13 Summary

In summary, some issues that may arise when creating a LO have been outlined above. It is recommended that:

- Existing material already available is explored and augmented

- The intended audience and pre-knowledge required is considered

- The intended engagement with the resource is considered

- Sufficient time for outlining content and developing a thorough storyboard is allowed

- A team with a range of expertise in subject and online learning is assembled

- Creation tools are considered thoroughly for appropriateness to both designer and user

- Copyright and IPR issues are addressed
- Content and presentation are reviewed regularly during creation
- Time is allowed for new ideas to be assimilated or rejected
- Time is allowed for evaluation, writing and dissemination

4. Reflection

The creation of the LO has been a huge learning curve, with the realisation that just having an idea and some existing classroom material is not enough to create a good online learning resource! There are many aspects which need consideration, some of which have been outlined above. However, it is believed this learning object fits into the definition by Ally (2004) of "*embodying instructional elements to foster understanding, facilitates the opportunity for self-reflection, and supports individual use*" (47).

It has been difficult to decide when the LO was finished. There has to come a time when the LO is deemed complete and placed into the repository, where LOs are stored for reuse. However, new ideas and suggestions may continually arise, and changes in policies may occur (for example, resuscitation guidelines), all requiring relevant LOs to be updated. Should this be done on a continual basis, or perhaps like books, new editions could be produced at regular intervals? One advantage of having material online, however, is that it is not as time-consuming or expensive to update, as, say, a book or a CD, in terms of replacing old versions. The question of where the responsibility lies for keeping LOs up-to-date also needs to be decided.

One rationale behind the creation of RLOs, is the idea that others can use the resource 'off the shelf'. Resources can be shared and reused, thus providing cost-effectiveness. This LO was produced to support a particular learning situation, so is somewhat limited in its application. For wider reusability, maybe it needs to be regarded as a RLO related to boxplots plus a learning activity, which can be contextualised to discipline specific examples, so producing a unit of learning (Rehak and Mason, 2003). However, a problem with this approach is that the resource may still not be quite what is required by a tutor. Maybe a compromise is that a good RLO includes the possibility of being edited somewhat to suit personal requirements. Alternatively, the granularity (i.e. the individual elements) of the LO could be investigated, and the possibility of breaking it down into further smaller RLOs considered.

5. Conclusion

This paper has described the need for a RLO around the exploration and interpretation of boxplots, and has discussed the creation of it, presenting some of the issues raised. It has looked at the steps and experiences along the way and provided helpful suggestions for future productions. Issues of production concerned content, delivery mode, copyright, creation of graphical and interactive elements, updating and reuse. It has certainly been a longer and more time-consuming experience than anticipated, and has highlighted the importance of reusability and a team approach, with constant reviewing.

During the creation of this learning resource, a question has arisen as to whether it can truly be termed a RLO, or rather a LO plus a learning activity to make a unit of learning. Certainly it will be reusable in terms of HP students in the data analysis module it was intended to support, and for further learning opportunities in other modules where statistical charts are discussed. It is also expected that it will have a wider application by facilitating editing of the example from literature from IP to other relevant themes.

The boxplots LO exhibits a granularity and structure which makes it useful for self-directed learning. It addresses a well-defined learning outcome but is small enough to fit into multiple teaching contexts (Parrish 2004). Overall, the creation of this RLO has been an enjoyable, although at times, a frustrating experience. It is hoped that users will gain from using the RLO, and its wider usage will be evaluated in the near future.

Acknowledgements

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Web-Based Learning in Practice Settings: Nurses' Experiences and Perceptions of Impact on Patient Care

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Abstract: This paper presents qualitative research completed in two groups of hospitals in the United Kingdom, as part of a larger mixed methods study. It involved eight qualified nurses caring for patients with gastro-intestinal cancer in general surgical wards. It explored the nurses' experiences of using an online programme and their perceptions of the impact of learning on patient care delivery. The nurses volunteered to complete an online open source package www.cancernursing.org. and meet for focus group discussions and interviews following a lapse of six weeks. Two of the participants experienced difficulties completing the package and following changes to the previously attained ethical approval, a focus group was conducted with these staff.

Analysis of the transcripts identified a number of issues for those considering the adoption of such modes of delivery within healthcare. Nurses referred to a lack of information technology skills and competence in computer use, access issues, organizational barriers and lack of protected study time. In spite of difficulties they gave examples of how their learning had impacted on patient care.

Keywords: Online learning, cancer care, nursing education, workplace learning, qualitative research

1. Introduction

Changes in health care delivery and education internationally are becoming increasingly focused on technology. Nurses are using the Internet to access information to support patient care (Dickerson and Feitshans, 2003). Hand held devices such as personal digital assistants (PDAs) are being used in a range of health related applications (Rempher et al, 2003), including educational support (Miller et al 2005). Given the explosion of technological use to support healthcare learning it is interesting that whilst increasing numbers of small scale studies present user experiences in educational settings (Conole et al 2002, Moule 2002), a limited number investigate the use of technology in healthcare environments.

Atack (2003) reviewed registered nurse's experiences of completing a web-based programme at home or in the workplace in Canada, finding technical issues of use problematic. Moule et al (2006, 2008) explored healthcare professionals' experiences of using web-based materials to gain resuscitation knowledge in the workplace and home. This preceded classroom skills practise as part of a blended learning approach. They found staff had difficulty finding the space and time to study in clinical settings. Those participants with easy access to computer resources and who were more autonomous in their workload management, such as medical staff, found online study in the workplace more achievable.

Evidence related to the impact of e-learning on clinical practice is also sparse. Further work by Atack et al (2005) explored the effectiveness of a six week online course. It concluded the format was an effective, efficient and convenient way to educate large numbers of staff, showing staff were able to transfer e-learning into practice.

This paper presents the findings of phase three of a research study that implemented an online education package in gastro-intestinal cancer nursing into two hospitals and evaluated the user experiences through focus groups and interviews. As part of the evaluation the users were asked to reflect not only on their learning experiences, but also on the perceived impact of their learning in clinical practice. The discussion also presents interview data from those nurses unable to complete the learning, reflecting on the issues of employing online learning as part of health care education.

The online open source package used is based at CancerNursing.org and covers the essential knowledge and skills necessary to prepare registered nurses caring for patients diagnosed with gastro-intestinal cancer (Irving and Sutherland, 2004). The organization is charitable and independent, accessing specialist nurses and healthcare professionals to develop and validate learning materials. The materials used in this study relate to cancer of the oesophagus and include eight study modules that encompass pre and post knowledge tests.

The study aimed to:

- Examine the nurse's experiences of using the online cancer care package

- Explore nurses' perceptions of the impact of online learning on patient care

A secondary aim was developed during the course of the study:

- To investigate the reasons why some nurses were unable to complete the online package

These aims were developed into the following research questions:

- What are nurses' experiences of learning online?

- What are the nurses' perceptions of the impact of learning from the web-based resource on their clinical practice?

- What are the barriers to engaging with online learning?

2. Methods

The research was a mixed method design employing both quantitative and qualitative approaches (see McGuigan and Moule, 2006). This paper presents phase three that used qualitative methods to support data collection through focus groups and interviews.

As the study necessitated access to healthcare professionals and practice areas it required ethical approval from the hospital research ethics committee and that of the university. This was secured prior to data collection and re-submission was required to conduct a focus group with those staff not completing the online package.

The study was advertised using posters and through ward meetings in both hospital sites involved. A convenience sample of ten registered nurses employed in surgical care volunteered and was recruited. Eight participants had completed the online package, whilst two participants had begun, but failed to complete the package. The participants received a project information sheet and all gave informed consent.

Two focus groups and three individual interviews were undertaken six weeks after the online programme was completed. One focus group was composed of five participants who had completed the programme (completers); the second was conducted with the two participants who had been unable to complete the online programme (non-completers). Three completer participants were unable to attend the focus group took part in individual interviews.

Open questions were used to guide the focus groups including:

- Can you tell me about your experiences of the online course?

- Do you feel the course has impacted on your practice, and if so could you give examples?

For those nurses attending the focus group for non-completers the following guide questions were used:

- Can you tell me about the difficulties you had completing the course?

- How has this made you feel about using online learning in the future?

- What could be put in place to try and support e-learning use?

The approach to data analysis was based on Pattern coding and Pre-structured case analysis, supporting data reduction, display and conclusion drawing using the framework suggested by Miles and Huberman (1994). The data were prepared for analysis by producing verbatim transcripts. Each transcript was treated in a systematic way, to enable the coding and theme development, whilst acknowledging the importance of group processes and dynamics captured in the interviews (Webb and Kevern, 2001). To support the rigor of the process, transcripts were encoded independently by two team members and the transcripts with identified themes were returned to the participants for verification of accuracy of content and interpretation.

3. Findings and discussion

The analysis of the interview and focus group transcripts identified key themes and within these a number of sub-themes:

1. New learning and its impact on practice and patient care

    a. Theory development

    b. Understanding the patient journey

2. Confidence in using computers

3. Personal experiences of using e-learning

    a. Lack of protected time

    b. Computer access

    c. Organisational barriers

From these themes and sub-themes areas emerged that the nurses perceived had an impact on patient care. The first theme and sub-themes focussed on the nurses' new learning, theory development and the confidence this engendered and their enhanced understanding of the patient journey. These, the participants felt, were as a result of the e-learning package they had worked through.

The other two themes related to the experience of undertaking e-learning and included improving their confidence in using computers and the difficulties associated with undertaking e-learning whilst working in a full time clinical role.

3.1 New learning and its impact on practice and patient care

3.1.1 Theory development

Although all the participants were registered nurses none had undertaken any specialist study in cancer nursing and all were working within a surgical unit that did not focus exclusively on cancer patients. Evidence of new learning and theory development was fairly minimal; however a small number of nurses did relate how the programme had helped them to develop aspects of their practice. They perceived this resulted from the e-learning package's identification and explanation of cancer care terminology, patho-physiology of cancer, and current surgical procedures. An example of this is comes from an interview with Tina:

'A patient was asking me about stenting...Um....and what it actually involved and what difference would it make. I think they'd already been told but I don't think......I think they find it quite ... easier at night to talk to someone because a lot of them state... you know ....they don't sleep very well, so you go and talk to them.... And, um..... I was able to go through that a little bit easier with them, because of what I'd learnt from the course'

Tina

This increase in knowledge led to the nurses feeling increasingly able to talk with greater confidence to patients. Robert outlined this:

'And if they [the patients] *say "I don't understand. What is the oesophagus and what exactly is it that I've got there" then you can kind of explain to them, can't you?*

Robert

This sentiment was echoed by Tina:

'.. I think it's made me better at talking to patients about things. If they, you know, if they say to me, "Well I've had this done," at least I know what they're talking about'

Tina

The biggest impact from the new learning was the positive effect it had on the nurses' confidence to care for cancer patients undergoing surgery. Sally for instance stated:

'There is a confidence in the fact that you think, well yes ... I'm not an expert in any sense of the word, but I have actually got some knowledge'

Sally

Developing knowledge though, is in itself not enough; the application of knowledge to patient care and the development of new or improved skills are the ultimate outcome, a sentiment echoed by Klass (2004) who notes the application of knowledge is vital to effective care delivery. The interviews suggest the nurses who participated in the study were able to transfer their learning to their clinical practice. Individual nurses reported an increased level of confidence in their ability to provide patients with psychological support and

information throughout the surgical journey. This suggests the e-learning programme has helped develop the nurses' knowledge base. It is acknowledged that nurses are more able to offer more effective psychological support if they have a greater understanding of the patient experience and are able to answer patients and their family's questions about their treatment and care.

This finding is echoed by the results of two studies. Atack (2003) explored nurses' experiences of online learning in Canada; where participating nurses reported the learning enabled them to develop evidence based practice. Atack et al (2005) explored the outcomes in terms of nurses' knowledge and clinical skills of an online triage programme provided for emergency practitioners, concluding that improvements in clinical performance and knowledge had resulted from knowledge gained through the medium of the programme. Psychological support is an important aspect of cancer nursing. The National Institute for Clinical Excellence (NICE) guidance on cancer services paper *Improving Supportive and Palliative Care for Adults with Cancer* (NICE 2004) emphasises the need for nurses to develop their role in providing emotional support for patients and their families. Without the learning acquired through e-learning programme it appears that the nurses in this study felt they were not able to provide this aspect of care.

3.1.2 Understanding the patient journey

The nurses who participated in this study worked within relatively enclosed surgical environments and had very little understanding of the patient experience of cancer care, including screening, diagnosis, chemotherapy and radiotherapy. All of the nurses who worked through the e-learning package felt they appreciated and understood the cancer patients' clinical journey in a way they had not previously. Most felt this better understanding would enable them to support cancer patients through their surgical journey. Examples of this come from Luke, Kerry and Sally:

'I learnt a lot more really .. especially the kind of aspects that we don't see on the ward pre-op .. staging results and investigations. It all kind of happened prior to their operation .. and also the follow up they get after leaving the hospital'

Luke

'I was primarily dealing with post surgical patients. You don't have the appreciation of what happened before with the patients and also after .. and the fact that some patients aren't suitable.. and I think with chemo and radiotherapy that was quite .. you know, it was quite difficult to understand, but that gave you [the e-learning package] quite a simple .. breakdown. I think of it and I have definitely think I have taken that into my new job'

Kerry

'I think it does give you a better awareness of the whole patient journey. You forget there is a whole world that goes on around them just coming in for an oesophagectomy'

Sally

Learning at work Gulanti (2006) suggests is a major part of nurses' development. It is apparent however, that nurses are often working within one environment for some time and are not necessarily exposed to learning opportunities beyond that environment. It is difficult therefore to develop an understanding of a complete patient journey. E-learning materials have in this case provided exposure to the complete patient journey and enabled the nurses to understand some of the care and treatment decisions made prior to patient's arrival and have an insight into follow-up treatments.

3.2 Confidence in computer use

Not all of the nurses who initially began the project completed the e-learning programme. There were clear differences in the level of information technology (IT) skills and confidence in using computers between those who completed the programme and those who didn't. This suggests that those who did not complete the programme were inhibited by the lack of personal IT skills and confidence. The nurses who did complete the programme found the e-learning easy to use. Comments from Jane, Luke and Tim support this:

'The actual site was quite user friendly and it didn't take as long as I thought .. I thought it would be more complicated'

Jane

'.. Well I'm not a computer buff, but I could, I understood how to use the online learning'

Luke

'I surf the net quite a lot and play around with the computer .. but yes, I mean it was quite an easy way to do a course .. I didn't have any problems with the IT side of it at all'

Tina

This suggests that learners need some level of IT skills and confidence prior to embarking on an e-learning programme and that those considering this type of learning who are lacking in skills or confidence are less likely to complete the course. Undoubtedly a successful completion also increase the confidence of all the learners, as Jane and Kerry noted:

'The more you use computers the more confident you get with it'

Jane

'Yes definitely .. I also signed up to another course on the same, you know, website'

Kerry

Those embarking on e-learning packages often report an increase in computer skills and personal confidence in those skills following the completion of an online package. A recent study by Moule (2006) found nursing students showed a marked improvement in confidence levels following a six week online learning experience. Barriers remain for those nurses who do not have the necessary IT skills and the gap between those with and those without could potentially widen if opportunities are not created to bring all nurses up to a defined minimum level of acceptable skill.

Only two nurses who failed to complete the programme agreed to be interviewed; both were clear that their lack of IT skill had played the major part in their non-completion:

'Although I have familiarised myself with computers to a point, I've never had any official training on them and I'm just not familiar with sort of computers on a wider level'

Lorna

'I don't have a computer at home and in some ways I suppose, for a lot of time, I bottled it, in all honesty .. My use of computers is completed limited, I mean to switch it on is a big thing. I've no idea. I'm a bit of a technophobe really'

Sally

Research during the 1980s revealed that many nurses felt anxiety about using computers (Martyr, 1988). It is concerning that this anxiety remains today (Moule, 2006); with many nurses revealing in a survey undertaken by the Royal College of Nursing (RCN, 2004) limited IT skills and knowledge. Despite the widespread use of computers within the home and the workplace availability does not always lead to use and skill development. Despite the introduction of formal IT training through the European Computer Driving Licence available for nursing staff working in the National Health Service (NHS) there are still staff requiring IT skill development. As online learning becomes a more popular mode of learning there is the potential for a significant minority of registered nurses to be left behind in developing the necessary skills and knowledge required to support evidence based nursing care.

3.3 Personal experiences of using e-learning

3.3.1 Protected time

Staff identified a need for protected time to complete the package, which was for the most part not available. Only two of the group were able to complete any part of the package at work and this was only facilitated as they worked at the weekend or on night duty where it may be easier to free individuals from the on-going ward work. The group felt that in general the work place did not provide an environment where this type of learning could take place:

'I worked on a weekend and it was so quiet, I just literally was able to hide away by the computer and just do it'

Robert

'I did about 10% on night shift ... the vast majority was in my own time. It's just not possible when you're on a shift to, you know, physically, even take an hour, or half an hour'

Luke

Those who failed to complete the programme also identified the lack of protected time as a problem. This may have been of greater importance for these nurses, if they, as a result of their poorer skills, needed longer to work through the package.

> *'I think the biggest thing is the time allocation .. not having the allocated study time. Another idea is that we'd perhaps be able to do a little bit while we're on shift, it was absolutely impossible'*
> *Sophie*

3.3.2 Computer access

Most of the nurses in the group had Internet access through their home computers and worked on the package away from the clinical area. Despite widespread computer ownership it is unrealistic to expect all nurses will have this facility. Indeed it could be viewed as discriminatory if nurses without home computers were not given the same access to learning and professional development; as one of the non-completers noted:

> *'I would have to have had to make special journeys into work or into the Education Centre to use the computers'*
> *Sophie*

There is an expectation that the increased number of computers within the workplace will enable healthcare staff to access information (NHS 2006), however, as Latchford (2003) noted there is inconsistency in the availability of computers within the NHS. Feedback from the group supported this view as Sally commented:

> *'The computers on this ward are ancient and overloaded and slow, and there's a wealth of research stuff and I'd love to say to everyone, go onto it, have a look at it, that's great, but we have you know, the computers are overused and anyway getting access to them* [is difficult]'
> *Sally*

Those who did not own computers were not overly keen to use computers within a purpose built computer centre, they preferred to use a computer within their work environment. Having a home computer was viewed by all to be the ideal scenario for those undertaking this form of e-learning, and those who did work at home welcomed the flexibility of being able to work at *'anytime'*:

> *'I would access at home and do it just as easily, and stop and start as it suited me'*
> *Tina*

Both Conole et al (2002) and Moule (2002) found learning at home provided distinct advantages for those with access to the internet, space and time to study, allowing individuals to arrange their study at a time, place and pace to suit them.

3.3.3 Organisational barriers

The group highlighted that if e-learning were to become more common along side class room learning then hospitals as employers would need to ensure the necessary support and structures to facilitate this mode of learning. These would need to include managerial support, infrastructure, the provision of web based material and passwords for those who access it, a process that is not without complications:

> *'You have to apply to .. for an online password to use the Internet at work .. and that sometimes you know, it takes quite a long time to get a password. So if you were to apply to go on a course in two weeks time the hospital would often take a month to get you an Internet password.'*
> *Luke*

Despite the move to increase technical specifications within the NHS (NHS, 2006) provision varies and can be locally determined. Organisations considering e-learning would need to review the technical capability of systems needed to support and enable the use of visual and interactive media (for instance sound cards). This will need to be coupled with a review of organisations teaching and learning strategies. Those offering variety in the mode of provision must recognise the needs of e-learners, providing support that enables access to learning materials and recognition of the learning activity wherever it is completed. This might also include developing the manager's awareness of online provision and support strategies that enable nurses to engage with the course and transfer their learning to practice.

4. Limitations

This study is limited by the small numbers recruited from two hospital sites. This affects the transferability of any results.

5. Conclusions

In conclusion, this is the first study of a stand alone online programme related specifically to cancer of the oesophagus and its use and applicability for nurses in clinical practice. Although using a small sample the results clearly show that staff who undertook the CancerNursing.org e-learning program benefited from completing the programme and increased their knowledge of cancer care. In addition the nurses reported an increase in their ability to transfer their learning to practice through improved emotional and psychological support of cancer patients and their relatives. The study identified important issues for consideration for those intending to develop or use e-learning for clinical nurses. It is clear that a significant number of nurses need preliminary assistance with learning IT skills before embarking on this form of professional development. Secondly there needs to be serious consideration about protected study time and access to IT equipment. Lastly online learning cannot be seen as a 'quick fix', a way of enabling nurses to professionally develop in their own time with limited support from employers.

Acknowledgements

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Face-to-face vs. Real-time Clinical Education: no Significant Difference

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Abstract: The main objective of this pilot research project was to determine whether the use of an internet broadband link to stream physiotherapy clinical education workshop proceedings in "real-time" is of equivalent educational value to the traditional face-to-face experience. This project looked at the benefits of using the above technology as an educational tool and its impact on educators only, it did not investigate possible related factors such as the cost of employing this technology nor the technicalities of setting up the proposed technology as these objectives were beyond the scope of the study. In 2006 three physiotherapy educators' workshops were selected for streaming at the University of Canberra. Two groups of educators attended the workshops at geographically separate venues, face-to-face (on-site) and real-time internet streaming (off-site). Group one (on-site) attended face-to-face lectures at the Canberra Hospital ACT Australia; lectures were streamed using a standard personal computer and digital camera to group two (off-site) at the University of Canberra and Calvary Hospital ACT. At the end of the workshops all participants completed the questionnaire survey. Obtained results were analyzed using t-tests. No significant difference was found between the participants' assessment of the educational value derived from either off or on-site attendance at the workshop.

Keywords: face-to-face, real-time, educators, clinical education, interactions internet broadband, telemedicine, videoconferencing

1. Introduction

This pilot research project evaluated the feasibility of real time video streaming as a clinical education workshop tool employing a broadband internet link; and determined if it was of equivalent, greater or less educational value to a traditional face-to-face clinical education experience. Therefore, the main objective of this project was to test the hypothesis that the educational value of the real time video streaming is of equivalent to face-to-face experience.

1.1 Research motivation

Lack of access to face-to-face clinical education environments is becoming a critical factor in the education of health care workers in Australia(Markova and Roth 2002), (Kamel and Batainah, 2004), (Crosbie et al.2002) and (Wiecha et al. 2003). Health care students have been traditionally required to attend and practice in real life situations in order to gain practical, clinical experience.

The shortage of health care workers across all the professions is placing increasing pressure on the capacity of education institutions to satisfy this component of the education process. This situation may be made easier by the use of real-time interactive video linkages that will facilitate the sharing of practical clinical knowledge between educators, students and health institutions nationally and internationally.

This pilot project will be of interest to health professionals and clinical educators working in rural and remote centers (Halit 2005) which require continuous update or refresher courses in order to maintain performance standards. This technology may also serve to enhance the capacity to support health care workers in regional areas when specialized support is required when faced with complex cases which otherwise may require transferring the patient to the nearest capital city hospital. Furthermore, follow-up patients have to travel to capital cities to see a specialist health care worker.

In many cases health educators in capital cities plan workshops where participation can tend to be limited to the health professionals living within that city. Other professionals on assignment in remote rural areas/other cities cannot attend such workshops due to geographical remoteness, financial and time restraints. This pilot project could potentially enable anybody anywhere in the world (Douglas et al.2004) to participate in a workshop.
Providing potential participants can access the internet they will be able to interact with the workshop organizers audio-visually in real time with potential associated reductions in cost of travel and time off the job (Zhe and Feng, 2006). Traditionally presentation of multiple versions of lectures for different sites is time consuming (Streaming video in the enterprise, 2006) and can be reduced (*The Australian IT,* 2006) because only one lecturer/presenter has to prepare the presentation.

A search of the literature has found no similar project has been researched in Australia especially in the area of real time interactive video streaming medical education using the internet.

1.2 Research question

Is a real time clinical education video link of equivalent educational value to traditional face-to-face clinical experience?

1.3 Limitations of this pilot research

This pilot research has looked at the benefits of using real time video streaming as an educational tool compared with traditional face-to-face clinical education. Therefore, this pilot research did not evaluate possible related factors such as the cost of employing this technology; neither did it focus on the technicalities of setting up the proposed technology as these objectives were beyond the scope of the present study. Furthermore, the results of this study were limited to the collected data from Calvary Hospital, the Canberra Hospital and the University of Canberra.

Due to the broad scope in the area of telemedicine, and the different names and definitions that exist for telemedicine; this research was concerned only with the comparison between real-time (synchronous) education and traditional face-to-face education in the area of clinical education employing an internet broadband link.

2. Method

2.1 Target audience and survey design

The aim of this research project was to determine whether a real time video link streaming of a clinical education workshop is of equivalent educational value to the traditional face-to-face workshop experience. An eight question survey was developed aimed at assessing the impact of this technology on a group of physiotherapy clinical education staff taking part in a regular series of clinical educator meetings in the ACT. The survey form was based on other similar studies,(Richard K. Ladyshewsky, 2004), (Nilsen 2005), (Russell, 2004), (Saeki et al. 2004) and (Sawada et al. 2000), however the questions were specifically tailored to assess the impact of the technology on the participants and therefore focused more on the overall experience of the technology, rather than, for example, assessing the academic achievements of participants using face-to face contact compared to those utilizing "off-site" technology.

The survey questionnaire layout and format were the same for both groups of educators. Method of participation in the study, either "off-site" or "on-site" was identified by a tick box on the top of the questionnaire form. Personal details were not required to be included on the form in order to protect the identity of the participants.

Given that the target audience had strong educational facilitating experience and were therefore in a position to critique the technology, the questions were designed to assess the opportunities and benefits of the technology. The survey questions examined the following issues:

1. Ease of attendance;

2. Opportunity to interact with the speaker;

3. Opportunity to interact with other participants;

4. I could clearly see the speaker and the speaker's gestures;

5. I could clearly hear the speaker;

6. I had access to the speaker' resources;

7. Ease of comprehension of the session; and

8. The overall educational benefits of attending the session

The educators were asked to answer each question using a scale from 0 to 10, with 0 being the least positive response and 10 being most positive response as illustrated below for question one:

Q1	Ease of attendance										
very inconvenient					convenient				very convenient		
0	1	2	3	4	5	6	7	8	9	10	

Figure 1: Example of question format.

Prior to commencing the data collection approval to conduct research with human participants was obtained from the Committee for Ethics in Human Research (University of Canberra).

3. Conducting and planning the workshops

This section discusses the protocol for hardware assembly and setting up the software used to enable the workshops to be successfully streamed and then outlines the workshops conducted.

3.1 Computer interface requirement: "Software"

The following computer interface software was required for the workshops:

- Microsoft Windows XP or above

- Microsoft .Net Framework 2.0

- Microsoft DirectX 9 or above

- M-view software V2.0/2.1 (Developed by Momentum Technology Group In Melbourne Australia)

3.2 Computer interface requirement: Hardware

The following computer interface hardware was required at the streaming site:

- A laptop or a desktop personal computer with 1.2GHz or higher processor

- 128MB RAM (minimum)

- 20MB free hard disk space (minimum)

- Available Universal Serial Bus 2 port (USB 2/ USB 1)

- High-colour display card (16-bit colour at screen resolution of 800x600)

- Broadband Internet connection, eg. ISDN, ADSL, cable, or wireless

- Audio teleconferencing unit

- Active telephone line

To optimize audio interactions, a teleconferencing unit was added to the video streaming package and used during the three workshops. The audio visual information was relayed through a laptop/PC into an overhead projector where it was projected or displayed to a wall or laptop/pc to the viewing group

The following computer interface hardware was required at the secondary site ("off-site"):

- Internet connection

- Windows 2000 and above

- Internet Explorer or Mazola Firefox with ActiveX plug-in capabilities

- DirectX 8.1 and above

- Administrator or Power User rights over the PC

- Active Telephone line.

- Data projector

- Laptop.

3.3 Local Area Network (LAN) security setting

To transport the video streaming through a server either a User Datagram Protocol (UDP) or a Transmission Control Protocol/Internet Protocol (TCP/IP) protocol was used. Normally large institutions prohibit live video streaming on their network infrastructures. In order to resolve the issues of the video streaming getting blocked by the network's firewall (intranet security Software that safeguards the outbound/inbound traffic of

information) the rules of the firewall had to be reset by the Network Administrator. Also, as a third party server was used during these pilot workshops these rules were set up at the primary streaming site. The IP address was 202.125.160.61 (media.m-view.com.au) which ran over ports 6116, 5012, 8008 and 80.

During the trialling of this pilot project, a server (a PC that controls the flow of information traffic and houses the firewall that stopes malicious intruders/hackers) was required to allow the rerouting of the real-time streaming audiovisual components from and to the internet. Momentum Technology groups' server in Melbourne was used and all trials were routed through their server. This pilot project was assigned an account; user name and a password by the LAN administrator.

3.4 Conducting the workshops

To achieve the objective of determining whether a real time clinical-education-video-link is of equivalent educational value to the traditional face-to-face experience, the above mentioned system was trialed at three clinical educator workshop sessions which were conducted as part of the on-going clinical educator training sessions provided by the University of Canberra Physiotherapy Discipline. Every workshop was preceded by at least one trial session to enable operators to assess the system and prepare for any unwanted eventualities that might disturb the streaming of workshop proceedings.

At least one technical assistant per site was required to be available during the streaming in order to assist in the following:

- arrange and operate the electronic communication equipment;
- ensure the availability of an internet physical connection and telephone line;
- direct the participants to the site;
- distribute the questionnaires to the participants; and
- collect the surveys at the end of the workshop

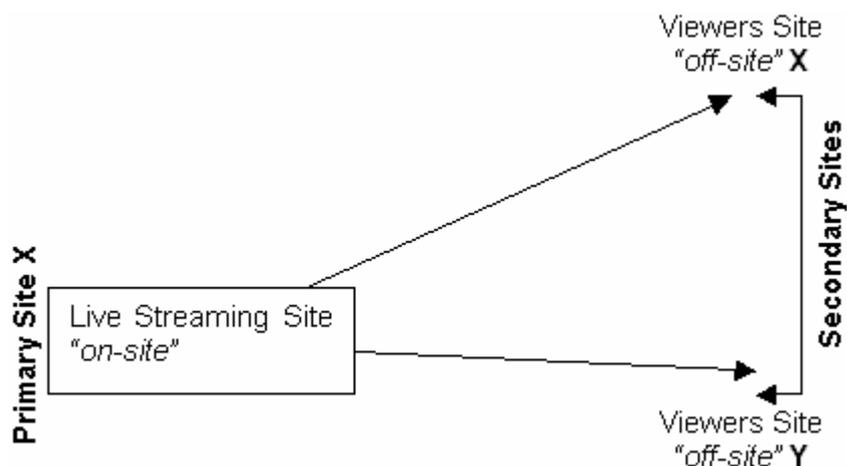The details of the three workshops are detailed below.

Figure 2: Diagram showing the streaming and viewing sites

4. Data collection

4.1 Data collection one

The first video streaming session was conducted on June the 27th 2006 at 01:00 pm and ran for two hours with the theme of this workshop being "Rehabilitation".

The primary streaming site or "on-site" venue was designated as the meeting room at The Canberra Hospital where the workshop took place and the University of Canberra and Calvary Hospital were designated as the secondary viewers' sites "off-site". For the face-to-face component, a group of educators attended a workshop in the meeting room at the Canberra Hospital ACT ""on-site"" and a second group of educators attended a meeting room at Calvary Hospital ACT ""off-site"". (Refer to Figure 2)

The hardware system detailed above was set-up and the face-to-face (primary streaming site/"on-site") workshop in the meeting room at The Canberra Hospital was streamed in real-time over the internet using a broadband internet connection, via the Momentum server in Melbourne, to the second group (secondary receiving site/"off-site") at the meeting room at Calvary Hospital. The streaming allowed the participants at the "off-site" to interact with the participant and lecturer at the primary streaming site "on-site".

At the end of the workshops all participants ("on-site" and "off-site") were provided with a questionnaire form to fill in accordance with the details discussed above.

4.2 Data collection two

The second video streaming session took place at a workshop conducted on June the 28th 2006 at 01:00 pm and ran for two hours. The subject of this workshop was "Cardiothoracic Physiotherapy" and as above, the video streaming session was coordinated and conducted as occurred in workshop one.

4.3 Data collection three

A third video streaming session took place at a workshop, titled "General Clinical Educator's Workshop – Introductory," which was conducted on September the 5th 2006 at 07:30 AM and ran for approximately two hours. The workshop was coordinated and conducted in a similar fashion to the previous two with the exception that the primary site ("on-site") was the University of Canberra Physiotherapy Department and the secondary sites ("off-sites) were The Canberra Hospital and Calvary Hospital .

At the end of each of the three video streaming sessions all participants ("on-site" and "off-site") were given a questionnaire form to fill in accordance with the details discussed above.

5. Results

Twenty three completed questionnaires were returned. Thirteen responses were obtained from the face-to-face sessions and ten from participants in the offsite session. The difference between the mean values of the *off-sit*e and the *on-site* scores were examined using t-test analysis to determine the presence of any significant difference between the mean responses for each condition. The t-test determines whether the two response groups differ because of chance errors, or is there a significant difference between these two groups. Basic factors that impact on determining whether an apparent difference between two groups is a significant difference or just an error due to chance include:

1. the larger the difference between the two means, the less likely the difference is due to sampling errors

2. The smaller variance among the participants, the less likely that the difference was created by sampling errors.

The mean response scores for each question are shown in Table 1 and Table 2.

Table 1: "On-site" mean response

"On-site"

Questions	OnQ1	OnQ2	OnQ3	OnQ4	OnQ5	OnQ6	OnQ7	OnQ8
Mean response	7.92	8.69	7.62	8.00	8.54	8.54	8.92	8.54

Table 2: "Off-site" mean response

"Off-site"

Questions	OffQ1	OffQ2	OffQ3	OffQ4	OffQ5	OffQ6	OffQ7	OffQ8
Mean response	8.6	7.3	6.4	5.8	7.9	7.1	7.5	8.2

Table 3: participant responses summery

on-site responses

participants	OnQ1	OnQ2	OnQ3	OnQ4	OnQ5	OnQ6	OnQ7	OnQ8
1	10	10	10	10	10	10	10	10
2	8	8	8	10	10	10	10	7
3	9	9	7	10	10	10	8	6
4	2	9	7	10	6	8	9	9
5	9	9	7	9	10	9	9	10
6	8	8	4	4	4	4	8	7
7	8	9	9	9	9	8	8	9
8	8	7	5	10	10	10	10	10
9	9	10	9	0	10	10	10	10
10	5	5	5	5	5	5	5	5
11	7	9	8	7	7	8	9	8
12	10	10	10	10	10	10	10	10
13	10	10	10	10	10	9	10	10
mean response	7.92	8.69	7.62	8.00	8.54	8.54	8.92	8.54

off-site responses

Participants	OffQ1	OffQ2	OffQ3	OffQ4	OffQ5	OffQ6	OffQ7	OffQ8
1	9	7	6	9	8	5	8	8
2	7	7	8	9	8	6	8	8
3	8	9	7	10	9	5	7	8
4	9	5	6	8	9	7	9	8
5	8	7	5	7	8	4	7	7
6	8	8	5	3	8	8	6	7
7	10	7	7	5	7	10	8	8
8	8	6	7	5	6	7	7	10
9	9	9	7	2	8	10	9	9
10	10	8	6	0	8	9	6	9
mean response	8.6	7.3	6.4	5.8	7.9	7.1	7.5	8.2

Table 3 above depicts the responses of the participants in each question for both offsite and onsite. The difference between the mean values of the ""off-site"" and the ""on-site" "scores were examined for the relative spread or variability of their scores using a t-test to determine the question: do the two groups ("on-site", "off-site") differ because of chance error, or is there a significant difference between the two groups. Commentary on the differences between to the groups is included in the Discussion section.

6. Analysis of the results

Analysis of the results of each question follows:

6.1 Question 1: Ease of attendance

The question sought to establish how convenient it was for clinical educators to attend workshop and whether the real time video link was significant. The mean response for the offsite for this question was 8.6 SD=(0.93) whereas for the "on-site" it was 7.9 (5.08), indicating the "off-site" was more convenient to attend. Using the t-test [alpha=0.05, df= 21, t-stat= -0.89] P (T<=t) at 0.19 suggests no difference between the group responses for ease of attendance.

6.2 Question 2: Opportunity to interact with the speaker

This question examined whether the opportunities available to interact with the speaker "on-site" in a traditional seminar environment were similar using the real time video link. The mean result for "on-site" for this question was 8.6 (2.06) compared to 7.3(1.57) for "off-site "using t-stat [alpha =0.05, df=21, t-stat=2.433] P (T<=t) at 0.012   suggests no significant difference between the group responses for Opportunity to interact with the speaker

6.3 Question 3: Opportunity to interact with other participants

This question examined the respondents' opportunity to interact with other participants during the sessions. The mean result for "on-site" was 7.61(4.09) and 6.4(0.93) for "off-site". . Using the t-test [alpha=0.05, df= 21, t-stat= 1.75] P (T<=t) at 0.048 suggests that the opportunity to interact with other participants was higher "on-site" than "off-site".

6.4 Question 4: I could clearly see the speaker and the speaker's gestures

This factor assessed the participant's ability to clearly see the speaker and the speaker's associated gestures. The mean response was 8(10) for "on-site" and 5.8(11.29) for "off-site". However looking at the t statistic at the 95% significant level [alpha=0.05, df= 21, t-stat= 1.61, P (T<=t) = 0.061] suggests no difference between the group responses for the participant's ability to see the speaker and its gestures.

6.5 Question 5: I could clearly hear the speaker

This factor assessed the participant's ability to clearly hear the speaker. The mean response was 8.54(4.94) for "on-site" and 7.9(0.77) for "off-site".

The t-statistics [alpha=0.05, df= 21, t-stat= 0.855, P (T<=t) = 0.20] suggests no difference between the group responses for the participants' ability to hear the speaker.

6.6 Question 6: I had access to the speaker's resources.

This question examined the respondents' opportunity to access the speaker's resources. The mean response was 8.54(3.94) for the "on-site" and 7.1(4.54) for the offsite.

The t-test [alpha=0.05, df= 21, t-stat= 1.67] P (T<=t) at 0.055 suggests no difference between the group responses for the opportunity to access the speaker's resources was higher using "on-site" than "off-site".

6.7 Question 7: Ease of comprehension of the session

For ease of comprehension the "on-site" mean score was 8.9(2.08) compared with 7.5(1.17) for "off-site". Using the t-test [alpha=0.05, df= 21, t-stat=2.6] P (T<=t) at 0.01 suggests that Ease of comprehension of the session was higher "on-site" than "off-site".

6.8 Question 8: The over all educational benefits of attending the session

The question sought to establish the overall benefit of attending the workshop for clinical educators and whether the real time video link was significant. The mean score was 8.54(3.10) for "on-site" and 8.2(0.84) for "off-site". Using the t-test [alpha=0.05, df= 21, t-stat= 0.55] P (T<=t) at 0.29 suggests no difference between the group responses for perception of the educational benefit attained by attending either session.

7. Discussion

7.1 Ease of attendance

Although the results for ease of attendance responses were not significantly different between the groups the participants overwhelmingly remarked on the increased "accessibly and convenience" that the availability of the "off-site" clinical education workshop afforded. This draws on a very important element of universal good practice, i.e., minimizing barriers to access to maximize benefits. For example, although the educators commented on the increased accessibility and convenience of the *off-site* session, not having the technology or the relevant technical expertise to set-up the technology will result in no attendance.

As this is a pilot study there was potential for improvement in many aspects of the streaming and presentation process. For example not all the workshop lecturers have adequate exposure to the computers, internet and telecommunication technology or the relevant technical expertise to set-up such system. It can also be confidently stated that with better physical arrangement and provision of better environment (lighting, extra software and hard ware components) a huge benefit will be realized by both technically-skilled and non-technically-skilled educator/participants .

High levels of required technical support may also be a barrier that might prevent the service from being used in the future. It is therefore imperative that for "off-site" education benefits to be fully realized, technical barriers, financial costs and other constraints must be minimized.

7.2 Opportunity to interact with the speaker & other participants

Opportunities to interact with the speaker were higher for the face-to-face session than for the offsite session. This indicates that "off-site" teaching may lead to a decrease in communication between participants and the lecturer and a reduced opportunity to ask questions. This position is supported in research on large class teaching which identified participant reluctance to ask clarifying questions, exacerbated by the channel limitations in interpersonal communication via synchronous audio-visual systems.

Halabi, Tuovinen and Maxfield (2000) indicated that technology has progressed significantly to minimize barriers to access. It perhaps should be a goal of the instructors to adapt to the new technology and actively attempt to engage the audience. Moreover, despite the fact that "off-site" venue presented educators with less interaction than "on-site", the fact that an opportunity was given to interact and conduct the session is significant in itself. This is particularly the case where sessions may be conducted in rural areas or where it is simply not feasible to travel to the workshop "on-site".

The participants also ranked the opportunity to interact with the other participants higher for the face-face session than for "off-site". Despite the participants preferring "on-site", some respondents ranked "on-site" as low as 4, and 5 for this question. The variance between the scores between "off-site" was not as great. It is pertinent to note that other studies have indicated that results of their research in the same area did not reveal significant difference between "on-site" and "off-site" (Ladyshewsky et al 2004).

With further planning and facilitation of the off-line workshop, for example using a live discussion board, particularly where there is more than one "off-site" venue, could allow "off-site" classes to be more effective in involving a larger percentage of students in discussion than face-to-face classes. This could occur where the session includes technology such as online discussions which would allow participants to be more analytical and reflective in their response.

7.3 Visual clarity, audio reception and access to lecturer resources

Although there was no significant difference between the mean responses for the two groups, comments from the participants, for example; that the slides were not designed well for video streaming as the colors were fairly dark etc, suggest that technical issues may significantly impact on these criteria. However both visual clarity and audio clarity can be improved with further investment in technology, for example each participant could view the sessions on their own pc/laptop rather view a projected image as well as better planning, Also educating the lecturer in the methods of enhancing the presentation for this environment could be of benefit.

The opportunity to access the speaker's resources was reported as being easier using "on-site" than "off-site". Mechanisms for enhancing the "off-site" experience could include for example, providing a copy of the slides to be presented to the participants prior to commencing the session or an editable softcopy which may arguably provide further benefits than the traditional face-face-to sessions.

7.4 Ease of comprehension and overall benefits of attending the session

There was no significant difference found in this study between the perception of benefit obtained from the sessions whether on or off-site. On the whole, survey questions were specifically developed to generate a valid data set so further research and trialing can be undertaken using these results as a foundation for a larger research project that could include/involve groups from different profession, level of education , technology exposure and normal laymen.

The groups who participated in this current project were from the same profession and almost similar level of education this may have positively contributed to the accuracy of the data collected and the relative closeness of the results .

Other factors that might have negatively affected the overall benefit scores of the participants for example may include issues such as venue lighting, the preferred study mode of students, for example some students might be morning learners while other might be evening learners etc… Kuznar et al. (1991)

This is supported in a study conducted in 2004 by Ladyshewsky from the Curtin University of Technology, Australia who concluded that there are many other factors that may affect the results, for example gender, age, geographical location, level of knowledge of communication, information technology literacy and participants' preferred mode of study. The study confirmed what many studies have indicated: results using online technologies and traditional face-to-face education delivery modes are at least the same. As some students prefer verbal instruction (Barnett and Aagaar, 2005), while other learn best through written instruction. The challenge of incorporating various learning styles into an online setting needs further attention.

Lecturers should examine the objectives of the course and whenever possible, seek to provide background about the subject that going to be streamed. For example sometimes the lecturers distribute a study guide or subject outline before the live session takes place which, when undertaken during the course of our pilot project, enhanced the participants capacity to follow up the streamed component and provided a reference to refer to for more detail and explanation during the session.

8. Conclusion

Audiovisual streaming over the internet has been used in many areas of education, training and monitoring utilizing different levels of bandwidth capacities and modes for example, real-time and store-and-forward and has been proven to be very useful tool especially in delivering and receiving training/refreshing courses.

It seemed that telecommunication in parallel with computer information technologies have been very rapidly advancing. These reportedly have enhanced the internet audiovisual capabilities and facilitated more possibilities for expanding the distance education and E-learning potentialities and diversities.
Off-site/remote participants' experience and benefits are as good as the traditional onsite classrooms/face-to-face experience and benefits with an insignificant difference. This difference could be attributed to some other factors such as facilitator's online teaching abilities/experience, unreliable communication hardware and/or participants' mode of study.

Utilization of the internet combined with Telecommunication and information technologies is promising a wider range of uses and a radical transformation of traditional education delivery methods.

The result of this study is a good indication of the usefulness and versatility of these technologies in allowing groups of educators to exchange ideas and participate in interactive real-time live seminars at geographically different parts of the world; yet it still requires further and wider research involving undergraduate and post graduate academics and students.

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On the Road to Virtual Europe - Redux

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Abstract: Virtual Europe is a web-based European community from which health education scenarios may be accessed for learning and teaching purposes. Featuring a map giving access to country specific resources, it is populated with different cultural case studies allowing contrasts between cultures to be examined. For example, a student could evaluate the differences between UK, Belgium and Dutch approaches to the care of a patient in a particular situation. The project is initially funded by the Consortium of Institutes of Higher Education in Health and Rehabilitation In Europe (Cohehre).

This paper offers a unique view on the benefits and limitations surrounding the development and implementation of a European health based virtual community. How will it facilitate the elimination of barriers for international mobility of students and staff? How easy is it to integrate into differing European health curricula? How does it compare to the experiences offered by new virtual environments?

During the first year, the pilot version of Virtual Europe was created incorporating cardiac and burns case studies. During the second year of the project, the aim is to refine the pilot and incorporate further case studies. During the third year of the project, Virtual Europe will be utilised within partner institutions as a learning and teaching tool. The project team are working to evaluate the user-friendliness of the system on an on-going basis encouraging feedback from the students and academics that will use it. Tutorials will be used to evaluate how successfully lecturers are able to utilise and integrate it within their curriculum. Evaluation will be iterative and formative, with feedback used to identify potential changes that will be incorporated into subsequent pilots, group sessions and system enhancements.

The paper presents a cogent and stimulating analysis of an e-Learning virtual health education project which is interprofessional in outlook; interdisciplinary in approach; intercultural in background; interactive in design and international in scope.

Keywords: interprofessional, simulated community, health education, Virtual Europe, intercultural, international

1. Introduction

Virtual Europe is a web based virtual health community from which educational scenarios may be accessed for learning and teaching purposes. The project is initially funded by the Consortium of Institutes of Higher Education in Health and Rehabilitation in Europe (Cohehre). Cohehre was established with the support of the European Commission and within the framework of the Erasmus-programme. The consortium is a non-profit organisation and was formed as the result of a European congress of 8 Institutes of Higher Education in Health and Rehabilitation in 1990. The organisation was established on the principle that adding a European dimension to the educational activities of its members would enhance the development and quality of higher education for health care professions. Two of the goals of the organisation are co-operation in educational innovation and research and facilitating the elimination of barriers for the international mobility of students and staff, through joint efforts to improve the accessibility of curricula and courses. Cohehre offers its members the chance to come together in order to stimulate change in the European and home environment with regard to health professional education. Through its activities it seeks not only to disseminate information that is pertinent to its constituency but also to aid mutual understanding of the issues and professional development of its membership. One of the ways it achieves this is through supporting project work. The Virtual Europe project is set within a European context and aims to meet Cohehre goals by being interprofessional in outlook; interdisciplinary in approach; intercultural in background; interactive in design and international in scope. The development of Virtual Europe provides an opportunity to work on a European project, which seeks to provide an innovative virtual learning resource to Cohehre partner institutions. Dissemination is a key component of the project with this paper being the second in a series of publications - a positioning paper, Scenes from a Virtual Europe having already been published (Pulman 2006). This paper provides an interim progress report on the challenges and opportunities surrounding a project that aims to benefit Cohehre members and their students. How will it facilitate the elimination of barriers for international mobility? What are the challenges of developing and integrating it within different European health curricula? How does it compare to the experiences offered by new virtual environments?

2. Background

The School of Health & Social Care (HSC) at Bournemouth University has a long standing reputation for providing student-centred, innovative programmes of education that prepare and develop health and social care practitioners. As part of the development of an interprofessional curriculum in health and social work education, a web based simulated community - the Wessex Bay Community - was created for use during the academic year 2005/2006. This community was populated by health and social care users and providers, living and working in a seaside town - Wessex Bay - and a rural community - Tarrant Abbas. The purpose was to act as a learning resource for geographically dispersed students and lecturers to facilitate interprofessional collaboration and learning around a variety of health and social care scenarios. The creation of case studies and their association with a property within the town or rural area aimed to create a communal environment. The community was developed primarily with an educational philosophy underpinning it and the process of learning was similar to creating cases for classroom discussion. An academic takes ownership of maintaining a case study with the ability to update it online with timely or relevant information. Each case study encourages academic activity through the publication of relevant background information which could include medical history, employment details or family circumstances. This information enables staff to publish materials aligned to the appropriate student year and academic level. Authors can prepare sequential information in advance and submit it together or on an episodic basis within a particular date range. Students as part of the curriculum are required to view individual profiles, brainstorm ideas proposed within them, evaluate key discussion points and draw conclusions from those discussions. Course communication focuses upon different family members, facilitating learning and teaching of students and staff through interprofessional collaboration.

Virtual Europe takes this concept and applies it to a European model. For example, Tracey Maher lives at home with her mother Pat and her brothers Wayne and Ricky. Her father is currently serving a sentence for aggravated burglary and is currently in prison. Tracey attends the local high school, where she met her boyfriend Danny who is in the sixth form. Having confided in Amy, one of the youth leaders at the local youth centre, Tracey visits her doctor with Amy and finds out that she is 8 weeks pregnant. Tracey tells her Mum who 'goes mad', bans Danny from the house and tells Tracey she's got to 'get rid of it'. Danny tells Tracey, 'they'll manage' and that he was going to ask her to marry him anyway. However when he asks his Mum if they can live with his family, she says there is no room. Tracey starts to be absent from school and when she is there, staff notice that she is very tearful. On the spur of the moment Tracey decides to see the School Nurse Simon, during one of his drop-in sessions. She tells him her story and says that she doesn't know what to do but thinks she wants to keep the baby. After some discussion Simon arranges for Tracey to meet with a counsellor at the local pregnancy advisory centre. He then asks if he can share Tracey's situation with the family's social worker and she agrees. The social worker then sets up a meeting with Tracey's permission, to explore ways forward. From this scenario a variety of learning tasks could be considered. One might include a meeting with the family, Danny, a social worker and other interested parties to explore ways forward in which role-play is used with students either in a face to face environment or via a discussion forum. The participants are asked to role-play one of the characters in the community with at least one observer of the process. The social worker acts as chairperson for the group and provides a brief summary of the content whilst observers are responsible for providing a summary of the 'process' and feeding back at the following plenary session.

This scenario and the discussion role-play that follows can be easily relocated and replicated in other European settings, so Tracey becomes Michelle in Belgium and Eva in Holland. However, each individual country has a unique cultural approach to health and social care issues highlighting diverse methods of patient treatment, care and education from the early stages of diagnosis to rehabilitation. The Virtual Europe model allows comparisons and contrasts between cultures to be examined (in addition to individually within each countries curriculum). One such example concerns the subject of euthanasia. Belgium and Holland are the first countries in the world that have legalized euthanasia and assisted suicide. However, not only are there fundamental differences between Belgium and Dutch law, but also the public debate and values underlying the debate show dissimilarities. In Holland the debate took more than 20 years and the subsequent law on euthanasia reflected an existing medical practice. In Belgium, the parliament came to vote on the euthanasia law after only half a decade of debate (Schotsmans and Meulenbergs 2002). In the UK, euthanasia is classified as a crime. Doctors may give morphine or other medication to relieve pain or distress, which may have the effect of shortening life, but it is illegal to give drugs with the deliberate intention of ending someone's life. Assisted suicide, where the individual is given the means to administer fatal drugs themselves, is also illegal in the UK (BBC 2007). A case study in this area could be compared and contrasted to other European approaches to this emotive issue, which is one way of helping to

internationalise the curriculum. This might be particularly beneficial for raising awareness of different workplace methods, which might also be useful before students went on international placement or if they decided to work abroad in their future career.

3. The pedagogical design

As discussed in Scenes from a Virtual Europe (Pulman 2006), for the pedagogical design of Virtual Europe, our main strategy originally concerned encouraging a deep learning experience by following a Constructivist approach incorporating Biggs theory of Constructive Alignment and acknowledging his concept of Educational Technology (Biggs 2003). The strategy would integrate Gibbs strategies for improving the quality of student learning (Gibbs 1992) with Biggs elements of good teaching (Biggs 1989). It would also consider Laurillard's model of the conversational framework (Laurillard 2002). This is where learning strategies are focused on engaging students actively through structured activities and realistic tasks to encourage learning by doing (Kolb 1984), with opportunities for reinforcement and consolidation through reflections shared and feedback from tutors and peers. However, as a young and relatively new area, it is expected that this basic pedagogic model will continue to evolve in line with advances being made in researching new models of learning with virtual communities.

The 2007 Horizon Report (NMC and Educause 2007) suggests that the educational use of virtual worlds is already underway and growing and predicts a time-to-adoption horizon of two to three years. At present, Virtual Europe aims to facilitate student enquiry and effective learning within a flat two-dimensional (2D) environment using individual case studies for analysis and problem solving. The scenarios can be managed and manipulated to engage students in a variety of online and face-to-face learning activities including case analysis and decision-making, discussion and debate, role play, and collaborative problem-solving. As educators and developers increasingly look towards a three-dimensional (3D) perspective and the technology continues to mature it is logical to consider how this changing pedagogical framework might be constructed to encompass Virtual Europe. One such group aiming to research new models for virtual world learning is the SEAL project (SEAL 2007). The aim of this project is to explore viable and preferred futures for learning in formal education through and with the Second Life environment. Second Life is a computer-based, simulated multi-media environment that runs over the web allowing users to interact with others via their own personal avatar – a graphical self-representation of themselves (Kamel Boulos et al. 2007). SEAL aims to create communities of learners, teachers, technologists and creative practitioners who will interact in the Second Life environment. The events will focus on the 'freeing up' of mindsets and working creatively to develop practical, sustainable, engaging and advanced approaches to using Web 2.0 technologies for learning and teaching. Plymouth University have also recently produced an overview on the potential of 3D worlds in medical and health education. Within the overview, they suggest three implications for practice (Kamel Boulos et al. 2007), which could be seen as relevant to the future pedagogical evolution of Virtual Europe:

- Thinking 'out of the box' rather than purely replicating real life and classrooms in 3D virtual worlds

- The need to focus and capitalise on what 3D virtual worlds are best at and determining and disseminating the optimum formulae for blended 2D and 3D media approaches

- More research being required to make 3D virtual worlds more accessible and user friendly and the need for learners, developers and educators to upskill in competencies to make effective and efficient use of them.

4. The interactive design

In Scenes from a Virtual Europe (Pulman 2006), we referenced other interactive resources that had helped to inform the initial developmental processes. In the area of learning resources on the web, the DIPEx project (DIPEx 2007) was highlighted as it provided a variety of personal experiences of health and illness aimed at clients and practitioners. Users are able to watch, listen to or read transcripts of client interviews and find information on treatment choices and support and this resource can still be considered a good example of what can be achieved in conveying a client experience in order to educate. Similarly, Nesta's report on Savannah (Futurelab 2005) continues to highlight an important point - an increasing awareness that young people's digital cultures are as likely to be shaped by interaction with mobile and games technologies as they are by PC applications and that all educational settings including Higher Education should start to engage with these tools. This growing recognition that the areas of simulation, online communities and virtual worlds are becoming seen as important learning and teaching tools of the future has

also been reflected in this years funding of research grants by Eduserv (2007) and in many papers and reports. Examples include Learning in Immersive Worlds (De Freitas 2007), Unlimited Learning - Computer and video games in the learning landscape (ELSPA 2006) and the 2007 Horizon report (NMC and Educause 2007). This acknowledgement shows a clear convergence between meeting the deeper learning needs of students and tutors with the provision of well-designed interactive experiences, experiences that engage users and maximize the conversational possibilities between themselves and the software. Virtual Europe aims to harness these experiences within its interactive design. Navigation is provided through a variety of options. A profile can be located through either a map - via the house of the resident - or other location (for example, a hospital ward). It can also be located from a list of all residents or by keyword searching within a particular country, area of interest or condition. Profiles of characters contain their name, age, gender, keywords associated with the character relating to their circumstances and a brief descriptive profile detailing their current situation and past history as appropriate. Narrative episodes can then be attached to individual character profiles. Episodes can adapt the temporal duration of characters by moving time forward or backward depending on the conditions and situations they wish to represent. They can also be time released over a period of weeks or months so a complete narrative pathway with a point of closure can be presented over the course of a short unit or longer year of study as required. For example, a young mother about to give birth to her first child one week - giving rise to one scenario - had her life moved forward by two years for the second week. In the second scenario she had lost one parent, now had two young children and was faced with the issue of having to move away from Wessex Bay - due to her husband moving jobs - leaving an elderly parent behind. Characters can also be moved to different locations around the community to reflect particular situations and circumstances such as admission to hospital.

However this experience is currently a 2D one which offers limited interactivity when compared to other more complex interactive experiences available to a user in 2007. Owners of Nintendo handheld consoles are offered increasingly detailed simulated experiences from the cute virtual world of Animal Crossing: Wild World to the challenge of becoming a doctor operating on patients in increasingly stressful situations in Trauma Centre: Under the Knife. The Sony PlayStation 3 will soon include an environment called Home where players can create avatars and wander through a seamlessly integrated 3D world filled with other owners (Kohler 2007). The increasingly intricate design and programming of these games, has led into other uses for virtual experiences such as the use of a virtually simulated environment to treat military personnel returning from Iraq. Created by a clinical psychologist, the new therapeutic approach to treating post-traumatic stress disorder is based on the computer game Full Spectrum Warrior (Dixit 2006). In Second Life, psychiatrists have created a visualisation of the hallucinations associated with schizophrenics. The Virtual Hallucinations building contains a closely researched recreation of visual and aural hallucinations, based on interviews with real people with the condition (Linden 2004). Within this virtual world, another avatar represents a medical student who has agoraphobia but is able to see himself in the simulated 3D environment, and feels he can become more comfortable with unfamiliar open spaces (Aquacade 2007). Behind the avatar Wilde Cunningham are several individuals who live with cerebral palsy - physically disabled with all but one confined to a wheelchair – who within Second Life are given the opportunity and freedom to move, fly and interact with others which doesn't exist to them in their real life environment. Elsewhere, American doctors and nurses have been able to experience the world of an undiagnosed heart attack patient through the Heart FX Pod. As well as encouraging earlier diagnosis by doctors, AstraZeneca hope the device will help specialists to be more understanding of patient needs (Aldhous 2006). Finally, in World of Warcraft, an online Dungeons and Dragons descendent, a group of virtual explorers were recently infected by a virus. Several died but the survivors spread the plague to surrounding areas. In the real world the online outbreak is now being studied by scientists to see what it can teach about the way humans respond to the fear of epidemics (Macintyre 2007).

We are not really that far removed from an ability to create deeply immersive 3D interactive simulations as the web tools and environments are already in place to create exciting global health education experiences. But whilst the possibilities for this type of experience are endless, the realities of producing quality educational experiences of an interactive nature require the same levels of work, financing and resourcing as professional software to become fully realised worthwhile resources and they must also be pedagogically sound. The limitations of the format must also be acknowledged. Wand (Reiser and Zapp 2002) contends that even a complex simulation is based on a claim demarcated by fixed rules whilst individual human life is surrounded by "authentic boundlessness, in which interaction can entail a corresponding degree of unpredictable consequences". In terms of the interactive design of Virtual Europe, we need to consider how the project should align itself with or within these new virtual environments. Should we be looking to move it into a 3D environment and if so how would this integrate into our existing prototype in a pedagogically

satisfying way? Or is it better to sit outside of any proprietary system such as Second Life and continue with our current model during the project lifecycle.

5. The project lifecycle

A work in progress report on the development of the Wessex Bay Community was presented to members of the Teaching & Learning Interest Group at the 2005 Cohehre Conference. Subsequent discussions highlighted the benefit of adapting the approach and ideas of a simulated community to focus on a wider international perspective. At the 2006 conference, the team members met to discuss a possible project idea, subsequently submitted to the Cohehre council and approved in July 2006. Cohehre funding for the project covered three years from this date to develop and refine a working pilot of Virtual Europe, hold regular update meetings and evaluate and disseminate findings. Work on developing the pilot Virtual Europe commenced in partnership with participating institutions in July 2006. During the first year, the aim was to create a prototype incorporating a case study from each partner with HSC also concentrating on the development of the prototype system. The first iteration contained a burns scenario from Erasmushogeschool, Belgium, a cardiac scenario from Hogeschool Amsterdam, Holland and a burns scenario developed by a Lecturer Practitioner in Burns and Plastic Surgery from HSC. The project team then met during November 2006. At this meeting a number of possible virtual ideas around simulation and health experiences were explored, and the initial case studies were walked through with discussion focusing on how they could work more effectively.

A presentation demonstrating the Virtual Europe prototype and a summary of the project development so far was presented to attendees of the 2007 Cohehre conference. As a result of these presentations, the project now has further interest and possible commitment from university faculties in Denmark, Norway, Sweden, Portugal, Bosnia-Herzegovina and Finland with potential areas of interest encompassing midwifery, continence care, rehabilitation, low back pain and palliative care. There is also the possibility of bid for European funding relating to the Seventh Framework Programme for Research and Technological Development (FP7). During the second year of the project, the aim will be to refine the prototype version of Virtual Europe and incorporate more case studies from each interested partner. The two existing project members are looking to amend their existing cases and develop individual uses for them within the Belgium, Dutch and UK curriculum. They are also seeking to test out the prototype, which will highlight any problems with the system and inform any new requirements. Partners who registered an interest at the 2007 conference have been requested to add two new cases concerning their preferred areas and to develop individual uses for them in their own curricula. The second iteration of the prototype will then be demonstrated at the 2008 Conference. During the third year of the project, the aim will be to utilise and evaluate the use of Virtual Europe within partner institutions curricula as a learning and teaching tool, based on the requirements for use identified in the second year. There is also the scope for internationalised use of other cases created by project partners.

As a result of a successful bid to the Health Science and Practice Subject Centre of the Higher Education Academy (HEA), it has been possible to evaluate in depth the student and staff experiences of interprofessional education at HSC by examining how students and staff made use of the Wessex Bay Community and the range of learning objects associated with it. This project - a virtual practice community for student learning and staff development in health and social work interprofessional education; changing practice through collaboration - has run from January 2006 through to December 2007 and a full evaluative report is due to be submitted to the HEA in January 2008 (HSC 2006). As the project team are still preparing this report it is not possible to present findings from the data within this paper, but some of the issues raised in student feedback during the evaluation concerning the Simulated Community can be shared. Some student feedback suggested there was a thirst for more interactive experiences and pointed to the need to enhance the profiles and structure of the community for future years. This particularly concerned the framework around the characters used in the case studies - their neighbours and friends and supporting network that weren't currently in evidence. However, students had enjoyed the uniqueness of the problem-based learning triggers used in the community as opposed to other methods experienced during the curricula year and also the element of time shifting from week to week. Feedback also suggested that many academics had not really engaged with the episodic nature of the community. Some characters did not have any development beyond the original scene-setting scenario, which in some cases resulted in students printing off the one-page profile to be discussed elsewhere. Where episodic methods were used there was more positive feedback such as occupational therapy and physiotherapy students following the case of someone progressing from a knee operation that included part of the rehabilitation process. The key point highlighted was the need to make academics more aware of the narrative possibilities available to them and

how these could be used within the realms of a simulated community. This focuses on the need to develop academic thinking toward that of a storyteller or scriptwriter, creating within them an awareness of how they could engage students through the possibilities of interactive narration. It is hoped some of the findings issued in the final report to the HEA will continue to inform the development and evaluation of Virtual Europe, as they will the Wessex Bay Community. The Virtual Europe project team are already monitoring and working on evaluating the user-friendliness of the current prototype system and making ongoing amendments based on feedback supplied from users. An evaluation of how effective Virtual Europe is will also be completed with the intention of disseminating findings at the 2009 Cohehre Conference. After the presentation of the evaluation, it is anticipated the project team will meet to decide on the future development and direction of Virtual Europe.

6. The challenges

Based on developmental experience with the Wessex Bay Community, aiming to develop the first iteration within a set time frame presented a series of challenges and problems. Creating the virtual aspect in an effective and engaging design, developing case scenarios with health and social care practitioners, piloting the community with users, evaluating the experiences and refining the system ready for curricular implementation and dissemination to the academic community was an immensely difficult process which is still ongoing.

Working with European partners has identified a much larger range of technical requirements that have been requested for inclusion since the original prototype of Virtual Europe was presented. These have included:

- Ability to create blank cases and upload a variety of differing file formats

- Refining the look and feel of the system

- Creating new towns and country maps for each interested party

- Refining the guest access and security mechanisms to cope with partner requirements.

Funding for this project has been identified as a problem, as the initial funding from Cohehre only covers limited travel costs for partners in the first two years with a little extra money available in the third. This has meant some limitations on what can be achieved using the model of full economic costing in terms of the design and development of the system and the creation and use of cases within the curriculum.

The perceived problems of engaging academics in thinking about new learning methods have been highlighted from HEA project feedback. This challenge becomes even greater when trying to present similar ideas and opportunities to a European audience. The wider cultural differences in teaching styles and pedagogic approaches means there is an even greater variation in the potential possibilities and problems of engaging academics in using the system effectively. Viewing the initial cases created for Virtual Europe has already highlighted several differences, with the Belgium burns case offering a much more in-depth approach compared to the UK and Dutch equivalents. There is an almost blank slate in terms of what systems like Virtual Europe can provide to a user and sometimes it is difficult to visualise how these can and should be implemented. This also raises the question of whether there should be a standardised approach on how case studies are used within the system or whether each participant should be free to input and use their cases as they wish. Similar decisions but conceptually more simple to address are those regarding the standardisation of file formats used within the system.

Finally, intellectual property issues still need to be finalised and important decisions need to be made regarding how new funding aligns with the initial Cohehre funding. At present, case studies provided are copyright of the individual universities that supply them and should they wish to remove their cases at any time they may do so. The technical aspects of the project (the programme code, images and associated materials) are copyrighted to HSC at Bournemouth University. The problematical issue of what would happen if various partners wish to withdraw from the project at any point still needs to be resolved. There is also a question around whether the system should exist in the public domain or whether it should sit behind a password protected area for use only by the Cohehre membership. Medskills is a Leonardo da Vinci project whose goal is to create a unique web realistic training and learning environment of evidence-based medical skills. The project spans 6 different countries and covers topics that include medical fundamentals, respiratory difficulties, chest pain, shock, minor surgery, burns and urgent delivery. The modules comprise high quality images, video and audio material, self-testing and a dynamic patient simulator and will be freely available to any Internet user once the project has been completed. The project targets education, but also has a social impact as it opens a dialog between European Countries to discuss the needs for a uniform

medical skills knowledge base (Medskills 2007). These questions concerning intellectual property and use are similar to those being asked of Second Life creators Linden Labs by educators wanting an open source rather than proprietary virtual world. This has recently resulted in some Second Life source code being made publicly available (Linden Labs 2007).

7. Conclusion

The Virtual Europe project has the goal of helping Cohehre to establish itself as a European learning organisation and community by allowing members to pursue issues of common interest and practice; relying on one another for information and learning; seeing themselves as part of a larger whole; supporting the sharing of divergent ideas; engaging in critical reflection; engaging in constructive change and creating a spirit of co-operation. Halfway through the project lifecycle, how successful has the development been?

We are making good progress on a number of issues surrounding the project with a sound technical prototype system that currently holds the cases for three partner institutes with invitations having been sent to other interested partners in June 2007. The second year is certainly the most important of the three in terms of being able to move the project forward so that we are hosting a larger number of cases and that these are being adapted and developed into useful and meaningful educational experiences that can be used successfully within each institution curriculum during the third year of the project.

Running a project within one organisation is a huge challenge in terms of trying to ensure that all participants are keeping up with their objectives. Attempting to do this on a European wide basis with the problems and challenges identified in addition to the communicational limitations imposed (an ability to meet in person only twice each year whilst relying on email for the majority of contact) is proving to be very challenging.

However, at this point in the project lifecycle we remain confident that the project is on track and that the potential benefits offered can be brought to fruition even as the virtual worlds and pedagogies that surround the project continue to evolve and mature.

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