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INTER-PROFESSIONAL GRADUATE ENTRY
PROGRAMME

Mini-Project:
An Evaluation of Web-Based PEBL for
an Inter-professional Graduate Entry
Programme

Final Report to Subject Centre for
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Introduction

This report summarises the findings and conclusions of a mini-project funded by the Subject Centre for Health Sciences and Practice. The project aimed to evaluate the perceptions of students and facilitators using web-based technology to support PEBL (Problem Enquiry Based Learning) in a Graduate Entry Programme (GEP) for nurses and medical students. In practice, many difficulties arose with implementing the online resource and therefore this report describes the practical experience of those managing the online resource and offers some recommendations to others who may be involved in similar activities. The report outlines the area under investigation, describes how the student and facilitator experience was evaluated and the methods used and identifies some of the main project challenges. It then goes on to describe how these were addressed and identifies the key findings from the project. A discussion section relates the findings and experiences to the literature and offers some recommendations for others involved in implementing online learning.

E-Learning

Increasing emphasis on the delivery of programmes through e-learning has led to much discussion concerning how best this can be achieved and whether e-learning is appropriate to support or deliver teaching traditionally carried out in a face-to-face environment. In this project, it was felt that, in order to truly enable the students to work in inter-professional teams and work effectively in clinical placement settings, web-based technology would be essential to support the PEBL process. Instead of frequent face-to-face facilitated sessions, students would be facilitated online as a virtual group for all but the first and last PEBL sessions. The use of an online system in this project is not simply "putting the programme online" but instead the students and facilitators were expected to use their discussion board to discuss issues in a similar way to a facilitated classroom based session.

The HEFCE Strategy for e learning (2005) sets out its position in relation to the national agenda for e-learning as follows:

"we believe we should limit the scope of our strategy, to be sufficiently focused, to the use of technologies in learning opportunities. The Government e-learning strategy defines e learning as any learning that uses ICT. In embedding this strategy we want to ensure that there is confident use of the full range of pedagogic opportunities provided by ICT. For HE this will encompass flexible learning as well as distance learning, and the use of ICT as a communications and delivery tool between individuals and groups, to support students and improve the management of learning" (p. 6).

This project about the application of an online facility to support student learning has highlighted how ICT can be used as a communication tool to enhance group activity in PEBL and also identified some of the barriers and constraints in embedding ICT within organizational cultures. For any strategy to be effective at operational level it must align with organizational, professional and individual goals and must be appropriately and adequately resourced.

Brief literature review on online PBL/EBL

The use of online discussions as part of PBL (Problem Based Learning) or EBL (Enquiry Based Learning) appears to receive limited attention from researchers. Some studies have been found e.g. Orrill (2001) Cheng (2004) and Tichon (2003) although the online

learning was used very differently from the approach taken in this project. Some studies, eg. Oliver et al (2003) suggest that critical thinking was enhanced through using online learning in both face-to-face and web based groups using PBL. This may have been because the virtual group had more time to think and reflect before sending comments. Salmon (2000) confirms this view and suggests that using the web enhances students' ability to discuss situations, it supports the engagement of users and aids the synthesis of knowledge. Cracowski (2001) noted that 89% of the students studied found web-based PBL user friendly and that it facilitated the improved acquisition of knowledge better than more traditional approaches. Orrill (2001) identified the need to consider the learning environment, as well as the tools used to support communication when developing online PBL because a lot of the learning relies on the social interaction between the students.

Jackson (2003) identified that there were a number of challenges that needed to be considered in developing an online based delivery. He concluded that, despite the challenges, a far richer learning environment was produced. Other writers (eg. Mayes, 2001) have identified the importance of trying to identify the pedagogical basis for online learning. He argues that learning online uses a constructionist approach and develops collaborative learning because of the learners' involvement in an online dialogue. He believes that to achieve this, the online learning tasks must be authentic and that the learners' involvement in learning must be supported by the teacher to promote a learning community.

In considering the development of critical thinking skills through 'web- supported PBL', (typically web-based scenario learning) Oliver's (1999) study described how teachers used the web to support the learning from PBL although there was no facilitation of the students' online discussions. Oliver concluded that although working online could help to develop critical thinking skills in students, this was mediated by a number of factors, the most prominent of which was that the learning environment limited the ability of the teacher to motivate the students because it was learner managed. Mason & Kay (2005) feel that using an online learning environment is appropriate where learning strategies, which require collaboration and group interaction, are used. In this project, learning to work and collaborate in a team was one of the specific outcomes for the inter-professional part of the programme. An online learning environment helps the sharing of knowledge and understanding between members of the group and through the transcript of the discussion there is a written record of the conversation and interaction.

Two of the factors that are crucial to ensure that the learners engage in the online environment are firstly what is being asked of the learner and secondly the learner and facilitator attitudes. Murphy (2004), O'Grady (2001) and Hewitt-Taylor (2003) indicate that an active role in online discussion by facilitators is essential in order to maximise the success of online discussions. They also stress the importance of the facilitator being directly involved rather than an optional extra in the process or a 'lurker'. The need to include learner activities is felt by Mason and Kay to be essential although they also emphasise that it is difficult to transfer face-to-face learning approaches to an online learning environment without taking into account the specific characteristics of the online environment.

For the online learning environment being studied in this project, there were seen to be advantages of using online facilitated discussions because the student groups were not able to meet frequently except for the first two weeks of the IPE (Inter-professional

Education) programme. IPE took place on one day of the week with the exception of the time the nurses were out on placement, which could be for up to 6 weeks at a time. This made the idea of using the online facility an excellent way of enabling the students to maintain contact and continue communicating as a group. Even when the students were in the university on their uni-professional programme they were rarely at the same location at the same time. Web-based learning is not dependant on either time or place; it is flexible and available for access when the student or facilitator wishes.

Issues being investigated

The investigation aims to evaluate the perceptions of students and facilitators using web-based technology to support Problem Enquiry Based Learning (PEBL) which forms part of an interprofessional graduate entry medical and nursing education programme (GEP) run jointly by the St. Bartholomew School of Nursing and Midwifery, City University, London and the Barts and the London Medical School, Queen Mary University, London. Both universities are multi-sited and some distance apart.

Project aim

To evaluate student and facilitator experience of inter-professional online Problem Enquiry Based Learning (PEBL).

The objectives of the project were to:

- Develop an understanding of inter-professional student and facilitators' experience of using bulletin boards to facilitate PEBL group communication.
- Generate knowledge about the development, management and use of bulletin boards in inter-professional PEBL groups
- Determine whether and how the use of the bulletin board facilitated group dynamics and achievement of the PEBL learning outcomes
- Identify staff development needs to support the delivery of the online learning environment

The inter-professional online PEBL in the Graduate Entry Programme

For the past ten years collaboration has taken place between the schools of Nursing & Midwifery and Medicine and Dentistry on a number of inter-professional health care projects. In 1994 a Clinical and Communication skills centre was established which had shared use by medical and nursing students. In 2002 a formal Alliance was agreed between the two universities, supported financially by the Higher Education Funding Council (HEFCE) to help development of inter-professional Health Care and Engineering programmes. Shortly after the Alliance was agreed, the two universities decided that Medicine should be included in the shared learning of the Inter-professional Graduate Entry Programme (GEP). Although the schools or departments involved in the project were all involved in professional education they had different organisational cultures and leadership relating to the production of health care professionals with different roles and occupational cultures.

The graduate entry programme started in September 2003. This innovative programme enables students on the adult nurse branch to complete their programme in 2 years and 3 months and medical students to gain their primary medical qualification in 3 years and 4 months. For the first year of the programme, approximately 20% of the curricular time is dedicated to shared learning, much of this in small inter-professional groups. Originally, it was envisaged that would include shared learning with Radiography and Radiology students but Radiography withdrew from the programme development in March 2003, so the shared learning planned across all three health professions never occurred.

Inter-professional education between health care professionals is being encouraged by government, as described in NHS plan (2000a) which is the blueprint for modernisation of the health service and in *Working together-learning together; A framework for life long learning in the NHS* (DoH, 2001). Shared or inter-professional learning by health care professionals is promoted as an effective way of increasing collaboration in practice, leading to better care for patients and clients and increased patient satisfaction. As part of this, healthcare workers will need to communicate effectively, collaborate and work as members of a team, as well as understand the roles of other health care professionals.

Student healthcare workers once qualified will usually care for patients within in the National Health Service (NHS). The NHS is a complex organisation currently characterised by rapid and continuous change and complexity. The increase in technology and subsequent knowledge explosion on the web has increased health workers and patients` knowledge of both disorders and treatments. Although Zuboff (1988) sees this as a way of liberating health employees, it means that individuals need to know how to access technology, to use it effectively as well as critically analyse and synthesise information found on the web. Healthcare students need to develop knowledge and skills that will enable them to be to be effective in caring for patients as individuals. This includes team-working, collaboration, communicating in a variety of media and the ability to work and learn in continually changing dynamic organisations.

Aims of inter-professional PEBL

The aims of inter-professional online PEBL are to:

- Enable students to learn from and about each other and to develop effective team working and collaboration skills. Barr (2001) notes that learning from and about each other is one of the key important outcomes of inter-professional learning.
- Facilitate students to develop an understanding of roles and professional identities of different members of the health care team. This is an essential requirement if students are to be able to work effectively in practice.
- Help students to be effective communicators using electronic communication systems. This was not initially the formal intention of the project. The electronic communication system was initially seen as a way of achieving the first two outcomes. As the project has progressed it appears that the ability to communicate with a group using electronic communication systems has become an important outcome.

It was felt that with the introduction of the new GEP programme, a unique opportunity was available to explore the experience of mixed group of health care students taking an inter-professional learning programme. A particular reason for establishing the bulletin boards was that students from the different programmes spent considerable time on clinical placements. By providing a means of communication linked to the University websites it was felt that this would enhance communication between students and facilitators and encourage group formation and process. Apart from the first and last timetabled face-to-face PEBL meetings, students and facilitators were expected to communicate as a virtual group using online bulletin boards.

Online learning was defined according to Gulati's (2004) definition which refers to opportunities to make use of the Internet for whole or part of the learning experience. The aim of the innovation was to develop a learning environment that encouraged self-directed learning, inter-professional collaboration and teamwork, whilst reducing the time the group and facilitator spent in face-to-face contact.

In the first year of the programme (September 2003) the medium used for online learning was a commercially produced proprietary software package. This product is used by both participating universities and by many other universities. It is a computer program that enables students and facilitators to access pages which contain course content, post messages to other members of their groups, upload group output online as well as submit assignments, access a chat room and organiser. From September 2004, students used a commercially downloaded bulletin board, attached to the programme website. The Bulletin board tool is another facility which students can use to post comments, thus "maximising student interaction beyond the classroom setting (and) learning how to critique the efforts of other groups as well as where, when and how to put these comments" (Aliponga, 2003).

Problem Enquiry Based Learning

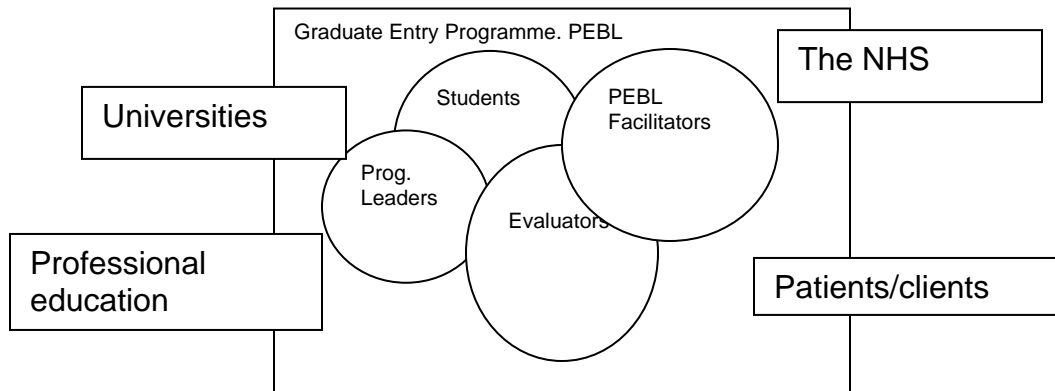
PEBL is a student centred learning and teaching strategy, developed as a hybrid framework between the 'Maastricht-style' PBL model used by the medical school and the EBL model used by the nursing school. Its underpinning philosophy is to encourage the student to manage and reflect on their own learning, to develop lifelong learning skills and to learn to work and collaborate as a member of the team. Small groups of 8-10 students are facilitated in their learning by a trained facilitator. The facilitator presents the students with a scenario based on the learning outcomes of the module, then guides the students through the steps of the process. All students and facilitators have access to an individual group, password-secure, web-based bulletin board for the duration of their programme.

Initial development for the PEBL scenarios

During the first year the two internal evaluators developed six inter-professional PEBL scenarios related to the inter-professional outcomes. These were sent to subject specialists for comments prior to use. It had initially been hoped to use the web more imaginatively by having the people involved in the scenarios living in a defined local area/street, with the addition of pictures to make the PEBL seem more life-like but due to the lack of time available to set up the PEBL, and lack of in-house web-development expertise this was not possible.

Key stakeholders in the project

The diagram below represents the key stakeholders involved in the project. Inside the square are the key participants, the outer square shows the organisations or people who are more distant stakeholders who may be affected either culturally or organisationally by the outcomes of the project.



The students

The September 2003 cohort initially comprised 57 students: 23 nursing and 34 medical students. The September 2004 cohort comprised 71 students of which 30 were nursing and 41 medical students. All of the students had first degrees and in addition, one nurse and one medical student in the 2003 cohort had recently obtained PhD's. Many students had given up paid employment to take the programme; others had come directly on the programme after having completed their first degree.

Many of the medical students lived in the university halls of residence, which was within walking distance from the university building where most of the teaching took place. These students were provided with Internet access. The nursing accommodation was a long way from the university buildings, necessitating travel on public transport. It was in a deprived inner city area with a diverse population. Students were not provided with Internet access. Many of the nursing students lived at home as they had family commitments.

The students were divided into groups of between eight and ten students per PEBL group. Most groups for both the September 2003 and 2004 intakes had two or three nurses and seven or eight medical students per group. Although it was recognised that this was not ideal, and may only serve to reinforce stereotypes it represented the actual numbers of nursing and medical students on the programme. Due to the loss of 7 nursing students from the September 2003 cohort (mainly during the first three months of year 1) some of the groups had only one nursing student. At the end of the first year, one September 2003 group had no nurses so the students decided to redistribute themselves around the other groups in order to continue their inter-professional learning. This imbalance is the opposite of most clinical practice areas where nurses usually outnumber medical staff.

In allocating students to PEBL groups, the programme directors attempted to get a mix of gender and ethnicity. Discussion took place prior to the start of the programme about

the IT skills of the students. As they all had degrees it was assumed that all students would have skills of word processing, using e-mail and Internet, so no formal IT training was provided for them. Groups were kept to a maximum of ten students as most research (e.g. Barrows, 1988 and 1997; Feletti, 1993, Magnussen et al, 2000) indicate that this is the optimum number of students that can engage in a successful P/EBL tutorial.

The facilitators

All PEBL facilitators for the two PEBL groups were self-selected volunteers, recruited via an email from the internal evaluators, which was sent out to both the medical school and school of nursing and midwifery. Information was given about the requirements to become a facilitator, which included experience in facilitating either PBL or EBL and a willingness to take part in a funded project for which we had ethics permission. It was agreed that a ratio of 1 facilitator per 10 students on the programme would be acceptable. Of the 3 nursing facilitators one had previously worked in the medical school and was familiar with the processes and procedures that the medical school used for delivery of PBL. Of the 4 facilitators from the medical school one was not clinically qualified. All but one of the facilitators asked to continue facilitating their group during the second year of the programme.

Facilitator Training

Training for facilitators for both September 2003 and September 2004 was delivered as a half-day training event. It was based in the computer laboratory to give facilitators an opportunity to explore the website and bulletin boards, as well as a brief introduction to the GEP programme and the inter-professional stream. Written information was given in the use of the computer package, which highlighted differences in facilitating an online group. This was the first time that the facilitators had met each other, there was very little time for socialising or group 'forming'. The facilitators that were unable to attend the training had individual briefings from members of the evaluation team.

Ethical issues

Ethics permission was obtained from the lead university prior to the start of the evaluation. Before signing the agreement to participate in the project, all facilitators and students had the project explained to them and were given a paper copy of the project information. Although there were no queries about the project, facilitators and students were provided with contact names and numbers in case they had queries at a future date.

Account of what happened in practice: Evaluation methodology

The evaluation was based on Guba and Lincoln's (1989) 4th generation evaluation. This is stakeholder-led with regular consultation and iteration of findings through meetings, discussion and written communications. It was agreed to appoint an external evaluator to the project to facilitate an objective approach to the evaluation process. Clarke (1999) stresses the importance of using an external evaluator as they bring with them a wealth of experience from other organisations. They are therefore able to offer an outsider's view of different aspects of the issues being evaluated.

The external evaluator led the regular consultation and iteration of the findings so that all stages of the process were informed not only by the findings but also by stakeholder needs and perceptions. Guba and Lincoln (1989) refer to a stakeholder-led evaluation as the evaluator "walking in the shoes of those taking part in the study". The external evaluator worked closely with the two internal evaluators, to define the scope of the evaluation, agree evaluation instruments and analyse the results.

Evaluation methods/ tools

In line with current educational good practice, a number of evaluation methods were used in order to gather evidence from a range of sources. This provided multi-source feedback, which could be triangulated to identify key themes and issues. Programme leaders discussions with the students to refine the programme on an ongoing basis supported the formal evaluation. The evaluation methods used were:

- One-to-one interviews with key stakeholders
- Individually completed questionnaires (facilitators and students)
- Focus groups for facilitators and students
- Analysis of the online communications and log on statistics using Salmon's (2002): "Five stages of online communication analysis"

One-to-one interviews

A small number of one-to-one interviews were carried out with key stakeholders prior to development of the questionnaires. The initial version of the first questionnaire was sent to all facilitators and key stakeholders for comments at various stages during the evaluation process. This helped to clarify the evaluator's understanding of the context and learning environment and also to help identify any issues about which the programme team were concerned. Further one-to-one interviews took place with some of facilitators of the September 2003 cohort between January and February 2004. This enabled the evaluator to incorporate such concerns into the process and also for issues to be fed back to the programme team so that immediate changes could be made if appropriate. Those involved in the action process research agreed that it was highly relevant to this project.

Questionnaires

Standardised anonymous questionnaires covering key aspects of the teaching and learning process were distributed to all students and e-facilitators on three occasions. For the September 2003 cohort, questionnaires were given out in December 2003 and June 2004 and for the September 2004 cohort they were distributed in December 2004.

The questionnaires were designed in consultation with key stakeholders involved in the PEBL programme, including course leaders, e-facilitators and technical staff. They clearly reflected the concerns and questions that the stakeholders felt were important. All the questionnaires followed a similar framework to enable comparison between students at different times and from different cohorts, and to enable comparison between students' and facilitators' views. In the first survey of the September 2004 cohort the aim was to evaluate the effectiveness of the Bulletin Board with a view to exploring whether this was a more effective method to support the PEBL process than commercially produced web-based technology used for the September 2003 cohort. The second and third questionnaires were modified versions of the questionnaire used in the first evaluation. In response to information from the September 2003 user statistics, a question to ascertain if students were acting as "lurkers" in the system was added for the final questionnaire (distributed in December 2004) evaluating the experience of the September 2004 cohort.

The questionnaires had a two-fold purpose, firstly to provide feedback on the students' and facilitators' views on how well the Bulletin Board supported the PEBL programme and whether it had helped the learning process, and secondly to identify key issues and areas for improvement which could be addressed by the course team.

Aspects covered by the questionnaires

Preparation for using the Bulletin Board for the PEBL sessions. This considered how prepared the students and facilitators were to use a proprietary software package and the Bulletin Board for PEBL, training, use of facilities such as chat rooms, technical and academic support, support materials, the quality of information provided, whether students understood what was expected from them and positive aspects and areas for improvement about using the Bulletin Board for PEBL.

Access to the system, site design and technical support. This area considered how effective access to the site, materials and technical support was from different areas (home, University and clinical placements) and the effectiveness of the different features on the site eg, chat rooms, email groups, bulletin board – whether they work in practice, what are the barriers to usage and how much do facilitators and students use these facilities (including duration, time of day, relation to sequence of learning process, etc.)

Using the proprietary software package and the Bulletin Board to support PEBL. This section looked at effectiveness of the different features on the sites e.g, chat rooms/discussion groups – whether they work in practice, what are the barriers to usage and how much facilitators and students use these facilities. It also considered the day-to-day usage of the system and how this worked as part of the support for the learning process. The aim was to explore the communication and look at the 'quality' of the discussions using the proprietary software package or the Bulletin Board, whether the communication process was enhanced or impeded using the proprietary software package or the Bulletin Board, how face to face communication and electronic communication related to one another, whether there was a preferred sequence of communication events and whether the PEBL process could be carried out entirely using the proprietary software package or the Bulletin Board.

Finally, people were asked whether they felt that the proprietary software package or the Bulletin Board had helped the students to work better as a group to achieve the learning outcomes of the PEBL tutorials. Students and facilitators were also asked what they thought were the best aspects of the proprietary software package or the Bulletin Board, what could be improved and what other features should be added.

Focus groups

Following an initial evaluation of the questionnaire results in the first student evaluations, (September 2003 cohort) a protocol for focus group interviews was developed. The focus groups were carried out at the end of the first two modules in the first year that the programme ran .in January 2004. The students for the two focus groups were self-selected and comprised both nursing and medical students. An additional focus group was held in January 2004 to which all the e-facilitators were invited, only three were able or wished to attend. Focus groups were not carried out with the September 2004 cohort. The purpose of carrying out the focus groups was to clarify some of the points identified from the questionnaire surveys, to probe more deeply into certain issues and to give the students and facilitators the opportunity to voice concerns or express ideas about the PEBL that had not been identified through other means

Analysis of the online communications and log on statistics

One of the internal evaluators from the School of Nursing and Midwifery analysed the online communications and log-on statistics. The analysis was mainly focussed on identifying how much the systems were being used by students and facilitators, partly to determine the use the groups made of the system so that interventions could be made, and partly to identify areas for technical improvement or training. An analysis of the discussions on the bulletin board was also carried out to try to better understand the reasons behind the students' and facilitators' use of the bulletin board.

Feedback from external evaluator

The external evaluator met or communicated regularly with the programme team responsible for the development and delivery of the PEBL inter-professional (IPE) programme. One representative was from the School of Nursing and Midwifery and one from the Medical School. These individuals were identified as the key stakeholders in the project. Initial meetings focussed on identifying boundaries of the project and key issues and concerns about the web-based based elements of the programme as well as agreeing the overall evaluation framework and methodology.

The external evaluator provided three detailed reports, which included analysis and key recommendations for the programme team. These covered a wide range of aspects concerned with the use and perceptions of the proprietary based soft ware package and the Bulletin Board to support the PEBL learning process. These reports provided an evidence base for the team to design, discuss and implement major changes. These issues will be discussed further in the subsequent sections.

Challenges encountered and actions taken

The challenges

There were a number of key challenges and complexities for this project in introducing a web-based PEBL supported environment to a new programme that was being delivered within a highly complex learning environment. The main challenges were seen as:

- The overall GEP programme is new, being delivered for the first time in 2003/4
- The Medical School and Nursing and Midwifery school delivered their respective uni-professional programmes, however the IPE programme is run jointly between the Medical School and the School of Nursing and Midwifery. The two organisations are part of two different universities, with different cultures, administrative, academic and technical infrastructures.
- This was the first undergraduate programme with a significant amount of IPE and there was no infrastructure in place to support the running of the inter-professional part of the programme.
- The IPE PEBL programme is itself a new programme, being delivered by a group of facilitators who are inexperienced in PEBL. Some have experience of PBL, some of EBL, none had previous experience of supporting PEBL in this way and all are completely new to this way of facilitating learning.
- There was no specific dedicated internal expertise in e-learning available to the programme team
- The programme team was unable to provide facilitators with any examples of online discussions in order to help them identify their role as e-facilitators.
- Those involved in implementing the inter-professional part of the programme were not released from other parts of their role, making meetings and discussions difficult to organise.
- The programme was being delivered in a highly complex learning environment with many competing variables and potential contaminants to the project objectives.
- The course team had to get to know one other, learn to work constructively as a team and understand each other's professional language.

These issues impacted hugely on the project itself and meant that the project aims, focus, objectives and purpose were subject to continual refinement as the programme team tried to respond to external barriers and problems in delivering the programme.

The evaluation of the first stages of the commercially produced proprietary software-based PEBL programme was carried out between December 2003 and February 2004 with the September 2003 intake and their facilitators and a second evaluation was carried out in May 2004 with the September 2004 intake. The second evaluation included facilitators from both the September 2003 and 2004 intakes. The final evaluation aimed to evaluate students' and facilitators' perceptions of the new Bulletin Board.

The programme team was very stretched in that it was trying to develop new working relationships across organisational and professional boundaries as well as introduce a new programme. There was a lack of understanding about the GEP programme and the role of web-based PEBL across both organisations. There were additional issues in agreeing what framework the problem or enquiry-based learning would take as both

Schools used different frameworks and were from different professions, and used educational perspectives. From discussions, it seemed that, despite these differences, the basic philosophy of EBL/PBL was consistent across both schools. A hybrid framework was developed which took elements from the PBL programme being delivered in the Medical School and from the EBL programme delivered in the School of Nursing and Midwifery. However, this approach meant that all the facilitators on the PEBL programme not only had to utilise skills to support e-learning but they also had to adjust to using a different framework for facilitating the GEP groups.

Facilitator support sessions for the e-facilitators and all those involved in the IPE teaching were provided by an external facilitator, however for the first year of the programme, take-up was patchy. Discussion was mainly focussed on generic issues related to inter-professional learning rather than the use of the online environment. Although the bulletin board did have a help section this was apparently little used by the facilitators.

At the beginning of the IPE course, there was little administrative support and the timescale for developing and introducing the new programme was very short. There were only four months after the approval of the programme for detailed curriculum development and planning before the programme was delivered for the first time. In addition, no one was released full time for the development work required to introduce an online learning environment. This led to some decisions being taken without full knowledge or consideration of the implications in terms of staff development and training and the ability to 'fit' the web-based infrastructure to meet online learning needs in support of the PEBL programme.

For example, the idea to support the PEBL programme with a commercially produced computer package was grounded in very practical reasons. It was used in both the participating universities, the nurses spent a lot of time on clinical placements away from the main campus and so the mixed IPE groups would have real difficulties in meeting frequently for face-to-face facilitated sessions. However, this rationale, coupled with the lack of development time, had two impacts. The first was that for both the September 2003 and 2004 cohorts the bulletin board was used more as a communication medium between group members than an online learning environment, which utilised all the potential capabilities of the commercially produced software package. This had an effect on both facilitators and students. The facilitators in particular did not use the full facilities available on the commercially produced software package. Most of them had little or no experience of using the commercially produced software package or of e-moderating or e-tutoring before the programme commenced. Some groups of students were not facilitated in their online discussions, as their facilitators did not appear to see the need to encourage take-up and consequently two groups never worked on the commercially produced computer package at all. Due to initial difficulties in accessing the commercially produced web based package many groups of students developed alternative communication systems via email, text or phone but this tendency was not actively addressed by some of the facilitators.

The second organisational issue, which had a huge negative effect on the introduction and development of the online learning environment, was the differing technical infrastructures between the two universities. This affected the introduction of the online learning environment. It was initially decided to use bulletin boards attached to the commercial package as it was felt that commercially produced software would offer more

features and capability for learning to the students and facilitators. It was agreed that staff in the school of nursing and midwifery in liaison with the main centre in the university would manage the site. The way in which the programme team envisaged the commercially produced software environment being used was very different from the usual way in which it was used at the university and this led to difficulties in designing and maintaining technical input to the site. The PEBL programme used the commercially produced software but did not require any module content to be inputted. Instead, the programme team requested that areas were set up which the students and facilitators would then populate. This was a new model of working for the IT support team and caused some difficulties in implementation.

Another difficulty at the start of the project was that students could not be logged on to the system until they had been registered with both universities. Although this took place during the first week of the programme there was a lag before they could be inputted into the IT systems. The lack of time for the programme team to test the site before students had started on the programme meant that the course team did not know that the commercially produced software was very unstable. The system kept crashing once large numbers of people were trying to access it simultaneously and in addition, some students and facilitators could not access the system remotely. This led to huge dissatisfaction with the commercially produced software system right from the beginning, which was very difficult for the programme team to overcome.

Actions taken from year 1 evaluations

The main challenge for the programme team was to address and work with some of the constraints imposed by the different academic, technical and administrative infrastructures and cultures of the two universities. Realistically, this could only be done on an incremental basis and through individuals and teams working together to deliver the programme. By the time the final evaluation was carried out in October 2004 (the second year in which the programme ran) many of the administrative difficulties had been smoothed out. For example students could easily log on from wherever they were, and the technical problems encountered at the start of the project were not evident. In addition, the programme team had worked hard to assimilate facilitators into the ethos and educational philosophy of the PEBL programme and the results of the later evaluations demonstrated how well the students felt the face-to-face PEBL worked.

Technical Aspects

The programme team tried to address some of the key issues that impacted on the programme and directly introduced a number of specific initiatives. In the first year of the programme, many of the early problems were concerned with the technical aspects of commercially produced software system with students being unable to log on (especially remotely) and with the relative instability of the system. The programme team worked with the IT support team to extend the online and telephone 'help' facilities and reinforced to students that this was available. By the second term (January 2004) the majority of the technical problems with the site had been addressed. The team providing the commercially produced software system within the University agreed to meet with the students to try to identify and eliminate the technical and access problems although only two students turned up to this session.

Facilitator role and support

The first and second evaluations highlighted the difficulties that some of the facilitators were having in acting as e-tutors. The facilitators' role is crucial, it is acknowledged that they do not need to facilitate every discussion, but need to be aware of what is happening online and to intervene where necessary. A dedicated bulletin board was set up for the facilitators, however after the first three weeks of the programme they did not make much use of this. Unfortunately the bulletin board system initially used did not have the facility for e-mail alerts so both students and facilitators had to actively go into the system to see if any messages were on the board. This possibly served to detract from its use, as it was "out of sight, out of mind."

The PEBL face-to-face process was perceived by both facilitators and students to be very successful and it appears that the facilitators have adapted to delivering the 'hybrid' model. Expectations from the programme team regarding the role of e-tutors were also reinforced to facilitators, enhanced by support sessions designed to help facilitators acquire a better overview of the programme and their role. At the start of September 2004 a facilitator handbook was developed and this was found to be very useful by facilitators.

During the first year there were problems in finding cover if a facilitator could not take a face-to-face session. From September 2004, an academic administrator was identified as the central point through for all communications. This system was very effective and ensured that all groups had a facilitator for all face-to-face sessions. These interventions resulted in the facilitators feeling more confident in their role and taking a more active participation in the PEBL activities. However, further training and development needs have been identified, particularly in the area of e-moderating and in raising awareness and understanding of what makes for an effective e-learning environment.

It was noted from the evaluations that groups were encountering different styles of learning and carrying out different activities in their groups. In order to address some of the variations between facilitators, it was planned that facilitators would change groups for the final 2 modules of the year so as to help to standardise the student learning experience. This was universally not wanted by the students so the status quo remained. Future groups will be informed at the outset that they will have a different facilitator for the second year of the programme.

Findings

The overall impression gained from the evaluation is that the PEBL process itself is excellent and students clearly get a lot out of it, both in terms of their learning and also in terms of developing an understanding of working with other professional groups. The students enjoy working as an inter-professional 'team'. The face-to-face tutorial sessions are very much valued and enjoyed. Many students commented that the PEBL sessions are very good and they help students learn together and appreciate different professional approaches and attitudes. Students thought that face-to-face learning was the best way to learn and communicate with one another in inter-professional groups.

Students did not see the proprietary software and the Bulletin Board as specifically enhancing the inter-professional aspects of the programme. They were however seen as useful adjuncts to communication, for example when the nursing or medical students were on clinical placements. Online PEBL does appear to work, especially when supported by a robust technical infrastructure and an easy to use online environment. From the evaluations it was found that students feel that PEBL is an excellent way of helping to improve interaction with other members of the group. Working in the PEBL groups has helped students to improve their presentation skills, it encourages learning from others in the group, enables students to discuss many issues and to share their own experiences from different personal and professional perspectives. PEBL is also seen as another way of preparing students to work together in groups or teams as developing health professionals, and this helps to facilitate inter-professional communication. Students feel that the principle of having a web based or electronic system to discuss issues is good, as it facilitates those who work antisocial hours, or who live away from the university campuses. It also helps the group to keep in touch when the nursing students are on their practice areas. Using the bulletin board helped to increase confidence and reduced the fear of using PCs. Having a group discussion board is useful as this can help to maintain group identity

The facilitators were asked if they had any comments about the role of the PEBL e-facilitator. There were mixed responses with some commenting that they found the process enjoyable and interesting, that they thought the students learned a lot and that the online learning environment helped the students to work together more productively. The facilitators thought that the face-to-face sessions were excellent and very productive and that they would welcome more regular meetings of facilitators. Others were less positive or declined to respond, the view was expressed that although it is important that the students keep in touch, they did not see the need for a mechanism as provided as they felt they could communicate quite easily using email and telephones. This communication did not however always include the facilitator or the entire group and it was not possible to always keep a record of the communication that did take place.

The findings from the first evaluations were almost wholly related to the technical aspects of the commercially produced software package especially the poor access to this and the instability of the system. This meant that no meaningful information about the impact on the process of learning was gathered. However, the evaluation provided the programme team with concrete evidence that was used to make improvements to the online learning environments (see 'Actions' section above) and enabled the team to address some of the issues identified such as the need for more facilitator training and support.

The introduction of the internet based Bulletin Board for the September 2004 cohort to replace the commercially produced software package has been a definite improvement, addressing in particular the problems experienced by the first cohort of the graduate entry course in accessing the system. The system has also proved to be very stable. The new Bulletin Board is much easier to use and remote access is much better except from a small number of clinical placements. The site is reported as being easy to use, clear, quick and simple and the students and facilitators who use it value its simplicity and speed. It is used much more than students in the September 2003 cohort used their system. It is seen as enhancing group interactions. The Bulletin Board in itself does not facilitate groups forming and task achievement without the supporting face-to-face sessions. From the evaluation responses, the Bulletin Board could not and should not replace face-to-face sessions as these are seen as vital and as the most interesting and useful part of the PEBL process.

In addition, students do not feel the Bulletin Board specifically aids the PEBL learning process itself although the evidence is that it helps group formation and the assumption can therefore be made that it would help facilitate learning. Students think the main purpose of the Bulletin Board is for communication between group members and see it as having limited value in learning, in terms of achievement of the scenario learning outcomes. These issues and the possible impact on learning need to be more fully explored but were not within the bounds of the current project.

Use of Bulletin boards

A significant number of students and facilitators say that they are not using the Bulletin Board but when the usage statistics are looked at (including the number of students who admit to lurking) students do use the Bulletin Board to access and read messages and keep themselves up-to-date with what is happening in the group. At the beginning of the project, the use of the system by students was reasonable but only when the facilitator supported this. In the second year, usage was much better even when the facilitator was not very actively involved. Some groups had in-depth discussions about the scenario and researching, others used it as a means to set up meetings or as an off-loading place to share experiences and problems. In this way, the online environment helped to facilitate inter-personal communications and group formation and also helped to maintain the group dynamic when the nurses were on clinical placement.

There are still some negative attitudes exhibited by some students and some facilitators, with one group in the September 2004 cohort not using the Bulletin Board at all. Some students say that they still find it difficult to access the Bulletin Board from home and from clinical placements and also that there are some cumbersome features eg. having to log on through the Internet and that files cannot be uploaded. In the final evaluation, all groups except one used the Bulletin Board although not all students in each group used it. There were no significant differences in responses between the medical and nursing students.

Summary of responses from evaluations

The section below presents a summary of the responses from the evaluation questionnaires, focus groups and analysis of online interactions of the first year cohorts in each of the first two academic years that the programme has been running, ie. 2003/4

and 2004/5. The responses are described in terms of positive and negative aspects under the headings used in the evaluation questionnaires.

Please note that the percentages stated are percentages of those who responded, total numbers have not been included as these results are compiled from the three evaluations.

Response rates to questionnaires

The questionnaire survey and focus group evaluation process was managed effectively and had good response rates. Response rates for the three student questionnaire surveys were 100 % (December 2003), 57 % (June 2004) for the September 2003 cohort and 98% (December 2004) for the September 2004 cohort.

The facilitator response rates were 71 % (December 2003) and 36 % (December 2004).

Preparation

Positive aspects

The majority of students (75%) felt that they were adequately prepared for using the Bulletin Board and 74% of students also felt that their facilitators were well prepared and informed. 71% of students felt that the information about using the Bulletin Board was freely available and 75% thought that the information was easy to understand. 83% of students felt that the face to face sessions with tutors at the start of the PEBL process were essential and 78% said that they understood what was expected of them during the PEBL sessions. Some positive aspects were highlighted by students such as a good introduction from tutors, a good first tutorial, a good computer introduction on the Bulletin Board– including practice opportunity, simulation, demonstration and that the information provided was helpful and informative. Students welcomed the opportunity to meet other students.

Some facilitators commented that the training sessions they had were quite helpful and that the new Bulletin Board was more useful than the proprietary software and was easier to use.

Negative aspects

Many of the negative comments from students related to the lack of being allocated a password at the beginning of the course before the training. Many students mentioned that the instructions were not clear at the beginning as to how to log on and register for the Bulletin Board and there were some mix-ups in communication. Some facilitators did not encourage their students to use the Bulletin Board. There were some comments that the facilitators did not feel ready to use the Bulletin Board, either because no training had taken place or because they could not make the dates offered.

Access and technical support

Positive aspects

Students and facilitators commented that the design of the Bulletin Board is good and easy to navigate; it has a simple, clear layout and good facilities including email. It is very accessible on the WWW and is easy to use and understand, links between pages are clear and the relevant information is obvious. The technical aspects and support work well. Overall, the facility to access the site from home, University and other remote locations is good.

Negative aspects

A few students have not used the Bulletin Board and two groups did not use it at all. Some said that it was hard to find on the Internet and when accessing from home there were too many “firewalls” to get through. 87% of students said that they had difficulty in accessing the Bulletin Board from their clinical practice area at various times although this was not seen as a particular problem as most students have access from home or the university. Some would like more training on how to use it. There were a few comments from students suggesting features that could be added to improve the Bulletin Board. These included: making it easier to put in links and emoticons; having a facility to upload slides, documents and attachments and making it clearer which messages have been read and which have not been read.

Using the Bulletin Board to support PEBL

Positive aspects

Although only 43% of students said they used the discussion boards on average once or twice a week 62% found them helpful. 84% of the September 2004 students looked at the Bulletin Board but left no messages i.e. they were ‘lurking’. 52% of students said that they would find a chat room helpful. 62% of students said that their facilitator responded quickly to queries about PEBL, 71% said that their facilitator responded appropriately. Some facilitators encouraged students to use the Bulletin Board and actively placed messages and information on the system. 64% of students felt that time spent using the Bulletin Board was useful. 72% of students felt that having access to the named discussion board for the different groups helped communication between students in the group and 54% of students felt that communication between facilitators and students was enhanced by access to the named discussion boards.

Negative aspects

57% of students did not use the discussion boards once or twice a week and one tutor group did not use the Bulletin Board at all. Some respondents commented that the facilitators should have been more informed about the Bulletin Board so that they could support the students more effectively. Although the responses to the closed questions were fairly positive regarding the usefulness of the Bulletin Board, responses to the open questions indicated that many students and facilitators did not find the Bulletin Board particularly useful to support the PEBL process. 51% of students felt that using the Bulletin Board did not help the achievement of outcomes from the scenario. Many students now use email and phone to communicate, some students do not have access to a PC outside of University and therefore access is difficult for them outside office hours. Some of the facilitators also do not use the Bulletin Board and communicate with their group by email. Students did feel they would like a chat room attached to the system.

Face to face tutorials

We asked students and facilitators whether they thought that PEBL could be delivered without face-to-face sessions. The overwhelming majority of respondents felt that face-to-face sessions were essential. Fourteen students thought that PEBL could be delivered using the Bulletin Board without face-to-face tutorials because this would save on travel time, would give more flexibility and enable working outside college hours. 68% of the students felt that the current number of face-to-face sessions in the course was about right, 18% of students thought there should be more face-to-face sessions.

The following reasons were amongst the most common cited to explain why face-to-face tutorials were essential:

- “Nursing is about people skills... face to face tutorials put you in a real situation and enables you to overcome nervousness, become confident or build up confidence” (R29)
- Some people don't use the Bulletin Board (eg, they don't have online access from home or clinical placement) and so we need to meet face to face
- Ideas can be shared, people can spark off each other, the group dynamics are vital
- Face to face tutorials help to develop inter-professional and team working and help to improve communication between nurses and doctors
- They are a more efficient use of time as everyone is working together and can clarify ideas and share out tasks
- PEBL needs to have face to face discussions, it is essential for the learning process
- Group discussion allows the facilitator to make sure that everyone understands – information can be misinterpreted when you do not meet face to face.
- Meeting face to face allows chance for presentation and rehearsals and improves our communication skills.
- You can go into more detail in a face to face discussion, discussing the scenarios over email would be ‘a nightmare’ (R53)
- Waiting for a reply on the Bulletin Board is time-wasting and frustrating
- “The best part of the PEBL sessions is the face to face contact” (R36)

77% of students felt confident about using the Bulletin Board for the next module's scenarios.

How the Bulletin Board has helped learning in a group situation

We asked students and facilitators whether they thought that the Bulletin Board had helped students work better as a group to achieve the learning outcomes of the PEBL scenarios.

Students from three of the groups responded that their group did not use the Bulletin Board very much and even if they did, a meeting was also held to clarify and finalise presentations etc. However, some of the ways that respondents replied to the open questions about how the Bulletin Board had helped learning included that it was useful to facilitate communication when students did not see one another (eg. when the nurses were on placement) and helped the group keep in touch; it enabled the objectives to be allocated and worked on; it enabled the posting of questions and queries to other students and to the facilitator; it was useful to get ideas and information about topics and to share information with rest of the group; it was easier to ask questions if you were unsure of a topic electronically than face to face and it saved money on phone calls to the rest of the group. Another benefit was that it helped students and facilitators learn about using an online learning facility.

Three students commented in the focus groups that they feel that the Bulletin Board works against the ethos of the PEBL course and working in inter-professional teams because they see that talking on bulletin boards is against the course ethos of improving communication. They said that the physical aspects of communication are important and there should be an emotional attachment for communication, which students feel, is not evident with the Bulletin Board. Others felt that having the Bulletin Board, as an adjunct to face-to-face communication was acceptable.

Positive aspects of the Bulletin Board

We asked respondents to identify some of the positive aspects of using the Bulletin Board to support PEBL. There were many positive comments from students.

The main positive aspects were concerned with facilitating communication, sharing information sources, accessing vignettes, posting information at any time of day and ease of access and use (it is seen as quick and simple to use). The Bulletin Board was also felt to help to build group relationships and facilitate inter-professional communication. The facilitator can also see the students' interactions and therefore get a feel for how the group is progressing.

Respondents liked the theory of being able to access from anywhere via the web, that messages can be left at any time of the day or night at the individual's convenience and in general it was felt that the site and facilities were easy to use.

Emoticons were available with the commercial bulletin board that was used in the second year September 2004 cohort. Students began to use these to convey additional meaning to their messages in a similar way to those that would be conveyed by facial expression. Salmon advises facilitators to use humour with care, but recommends the use of emoticons. "Online interaction is mostly text-based, so body language, eye contact and facial gestures (all essential components in face-to-face communication) are completely absent" (University of Kent, accessed 14/04/05)

Aspects about the Bulletin Board based PEBL that need improving

We also asked respondents to identify some of the aspects of the Bulletin Board based PEBL that needed to be improved. There were a number of very negative comments from students, it seems that these were from students who were reluctant to use the Bulletin Board although the specific reasons are not clear.

Some of the comments related to technical aspects, which have been described above, such as making the access easier, especially remotely and from home, and improving the way the system works eg. making it possible to attach files. Not being able to attach files was felt to be one of the main problems with the Bulletin Board in contrast to the experiences of students using the proprietary software package in the first year of the programme where this was highlighted as one of the most positive features. It was also felt that it would be helpful to have reminders when new messages are posted (eg. like MSN messenger). For the September 2004 cohort, a feature was added so that when a message was answered an alert e-mail was sent to the person who had posted it, this links straight back to the group bulletin board for ease of use.

A number of comments were made concerning the need to define the purpose of the Bulletin Board more clearly. Many respondents, both students and facilitators, were

unclear as to why they were using the Bulletin Board except as a means of communication. The facilitators needed to have more clarity about what they needed the students to do when they were using the Bulletin Board. One respondent said that *“I don't see the benefit of using the Bulletin Board at all, instead we have spoken in person, we only use the Bulletin Board because we know we get marked on it”* (R53). This was highlighted by 84% of students noting that they often ‘lurked’ on the Bulletin Board but did not participate in the communications.

Many people commented that they could have equally effective communication about topics by phone, face to face and email and asked why they needed the Bulletin Board. Some students said that the input of the facilitators needed to be clarified and that it was inconsistent between different groups - some facilitators did not get involved with the Bulletin Board and others did not look at the Bulletin Board regularly.

Additional features

We asked students and facilitators if they thought any other features should be added to the Bulletin Board. The following suggestions were made:

- A facility to attach documents and upload files
- It should be easier to put in links
- More ‘smileys’
- It should be easier to see which messages had been read
- It should be able to be accessed from the ‘knowledge base’ (ie. the Barts Intranet) rather than on the internet as it was hard to find
- There should be better support and training to use the Bulletin Board

Analysis of the log-on statistics and online communications

Statistics from the usage indicated that all but one of students from the September 2003 cohort had accessed the board between September and December 2003. The number of sessions in which students participated ranged from 2 to 132. The students also used the system to read messages on the discussion boards; the statistics indicate usage between 0-160 with three students not reading any messages at all. The number of messages posted was considerably fewer, ranging from 0-50 with eight students posting no messages at all. The statistics also indicate that the students used other facilities available on the proprietary software package such as e-mail, calendar, chat room and organiser. It was not possible to access usage statistics for the facilitators.

For the September 2004 cohort, a commercial Bulletin Board downloaded from the Internet was made available via the programme website This was introduced because the students’ usage of the proprietary software package had been so poor, due to the technical difficulties in accessing the system from some computers and the instability of the system which “threw the students out” after they had actually logged on. This caused students to be frustrated as can be seen from the following communication.

"Greetings my fellow earthlings finally got this to work. I had to get some plug in and after the 11th attempt it's finally going. "

September 2003. Student bulletin board

"Hi every one, doesn't work at home for some reason so here I am at the ...university!.

September 2003 student bulletin board

The students' motivation to use the system became increasingly low at this point.

Usage statistics

Statistics regarding usage are not available in exactly the same form (the first system monitored log-ons, the second system monitored participation in discussion threads) so it is not possible to compare usage of the two different systems by students and facilitators.

Facilitator usage

Usage by the facilitators was low. Two facilitators from the September 2003 and September 2004 PEBL groups did not use the system at all. The number of messages left by facilitators for the September 2003 intake between September and December 2003 ranged from 0-5 and for the September 2004 intake 0 -2.

Student usage

The usage by the September 2004 cohort was much higher than for the September 2003 cohort. The number of topic threads on the bulletin boards for the September 2004 cohort ranged from 1- 42, and the number of replies to each of the topic threads ranging from 0- 11. The total number of messages for the September 2003 cohort between September to December 2003 was 58 and for the September 2004 cohort during the same period, the total number of messages was 270.

Analysis of online communication

Some of the asynchronous online communication was also analysed, developed in line with Salmon's (2003) five stage model of e-moderating based on her research into online communication. Each of the stages requires different e-moderating skills. These are indicated below, with examples of each given from the Bulletin Board. Analysis of the online communications indicated that the tone and quality of the discussions is very good. It provides a facility for students to communicate in their own way as part of a group and to achieve tasks associated with achieving the learning outcomes. It was noted that emoticons ('smileys') were often used by the September 2004 cohort as a way of compensating for face-to-face communications and to express emotions. Students are clearly used to using such mechanisms through messaging, email and texting. There were some differences in style, tone and register between the facilitators and the students, which possibly related to age and cultural differences.

Stage 1 - Access and motivation. This stage relates to the individual accessing the online system with the role of the facilitator being to welcome and encourage the participants.

Student *Where are you group?*

Facilitator *Hi well done for finding your way in, hope this will encourage the rest!*

Student *I have just managed to find my way into the bulletin board so many thanks ... for the instructions*

From September 2003 cohort

Stage 2 - Online socialisation. In this stage, it can be seen that participants begin to send and receive messages, the facilitator's role is to sort out any problems.

Student *Hello !! hope everyone is alright !! I was wondering if we could meet up on Wednesday around 1.30 are you free the nurses are ! hope to see you then ! Jane (pseudonym)*

Student *Hi Jane meeting up sounds a good idea we are free from 11.30 earlier would be better if you have lectures then obviously half one is fine.... what does every one else think? John (pseudonym)*

Student *Hey Jane, spoke to John and we are both ok with 11.30 if you are! Peter is not well-will explain all tomz but he has a suspected contagious rash so can't leave home at present-I will speak to him later to see how things are going.*

Student *Usual place is probably easiest-will be there at 11.30 unless we hear otherwise-can you contact the nurses for me as I feel it's a bit late in the evening to call and have lecturers first thing tomz*

Bis x

Student *Hello!*

Sorry we ve got lecturers until 13.00 atso we can't make it would 13.30 be alright I'll tell the nurses thank you! sorry ! hope Peter gets better ! Jane

From September 2004 cohort, one week after the IP programme started

Stage 3 - Information exchange. In this stage, participants begin to exchange information about the programme with the facilitator acting as a source of information.

Student *I have the work but still have to decide with H where it will best fit as she has made some recent changes to her part. So the work has driven you to the bottle already !! see you tomorrow. A*

Student *Hi A just wanted to let you know I have now e-mailed my final draft of our teamwork section to J thanks so much especially for all the hard work and effort & sleepless nights you put in*

September 2003 cohort

Stage 4 - Knowledge construction. Here, interaction becomes more collaborative with group discussion and conferences. The role of the facilitator should be to maintain the flow of conversation. There were very few examples of this; it appeared that the students preferred to meet face-to-face to discuss issues related to their PEBL presentations. For example, it is possible that the conversation below may have continued to move onto knowledge construction, if the facilitator had taken part in the discussion.

Student *..... I've been trying to do some researchand am finding it quite hard to get relevant info . I've found stuff from the GMC and BMA about how doctors shouldn't treat themselves or close family, but it doesn't mention about students treating neighbours! What do the RCN or the register of nurse's say?*

F

Student *Hi F I have a copy of the nursing and midwifery Code of Conduct.... so all info available there.I ve jotted down a few ideas and have got some info on confidentiality.*

Student *Can't find much apart from general guidelines though. Think this needs talking over coffee !!!*

September 2004 cohort. Discussion on first PEBL scenario

Stage 5 - Development. Students begin to develop critical thinking skills, and the facilitator helps them to reflect and articulate their own learning. The evidence from the interactions does not provide examples of this level of discussion. This may be because this was not a purely online programme.

Discussion

This section explores some of the issues identified through the project and considers the impact of the changes made to the online learning environment and the initiatives introduced to support students and facilitators after the first year evaluations.

Gilly Salmon (2000) describes five steps as essential in the e-learning process:

- access and motivation
- online socialisation
- information exchange
- knowledge construction
- development

She also notes that both the technical aspects and appropriate 'e-moderation' must be in place for effective e-learning to occur. This section use Salmon's 'steps' as a framework for evaluating the effectiveness of web-based PEBL as a learning process, exploring the impact of the technical infrastructure and highlighting differences between the first and second year programmes, which used different online systems.

Access and motivation

The first year experience

One of the main issues was that the proprietary software package was new to both the technical and academic staff and this caused major problems in the introduction of the web based PEBL. Some of the problems related to technical issues such as students and facilitators being unable to access the site remotely, the slow running of the system (particularly at times of high usage), having difficulty in logging on and staying on the system and the difficulty using some of the features such as attaching files. Access was a real barrier for many students. Remote access from home and clinical placements was very difficult, some students did not have PCs at home and some of the nursing students did not have free Internet access in their residences. Facilitators also experienced problems with access. The PCs at the main University sites were very good and access to the proprietary software package was on the whole easy and quick but students could only use these PCs before, after or between classes and many students lived or were on clinical placement at some distance from the sites. The benefits of having a web-based system with essentially 'open' access were lost because of these issues and this led to loss of motivation by the users of the system.

Developing and maintaining motivation therefore became a huge issue. At the time of the first evaluation, many students and some of the facilitators had lost motivation to use the initial system.

Timmis and Cook (2002) note five points concerning motivational strategies specific to online learning:

1. Virtual learning needs to provide opportunities not available elsewhere
2. Tangible external motivators need to be built in
3. Learners must have clear expectations in a virtual environment
4. Specific guidance is needed to exploit opportunities
5. The level of threat must be managed through support and peer group induction

The proprietary software package did not provide many opportunities that were 'not available elsewhere'. Because the purpose of the proprietary software package as an additional learning environment was relatively unclear, the advantages of an online learning environment were lost and students and facilitators found other means of communicating with one another which were more effective, including email, phone and face-to-face meetings. However these modes cannot be moderated by the facilitator in a similar way, as a discussion thread would be. In effect the students tended to become unfacilitated during the time spent between face-to-face meetings with their PEBL facilitator.

At the beginning of the course some 'tangible external motivators' were built in although these were not really 'positive' reinforcers ('carrots'). Students were told that their logons to the both the bulletin board systems would be monitored and that communicating via the bulletin board system would contribute towards their group assessment grade. Students in the September 2003 cohort therefore made a special effort to use and became very frustrated and somewhat resentful, not only because the system did not work very well but some of the facilitators 'withdrew' from the process, they appeared to receive mixed and messages about how their usage of the proprietary software package contributed towards formal assessments. The expectations of students were therefore unclear and specific tasks designed to encourage and 'reward' participation would have enhanced motivation.

Lack of experience and training of the e-facilitators as e-moderators. and sheer complexity of the system prevented further development and use of the proprietary system. This was envisaged mainly as a communication device rather than as a traditional e-learning environment. The medical students in particular soon became used to using the University Intranet (the 'knowledge base) where course materials were put up and later in the first year they were expecting the proprietary software package to site to run in a similar way. The success of the face-to-face tutorials and the fact that many students especially the medical students met on a daily basis tended to conflict with the students' perceived need to work within a virtual learning environment. Because many of the facilitators did not actively engage with the e-learning environment and some also lacked the computing skills required to act as an e-moderator, students were not encouraged to use all the features of the proprietary software package

The second year experience

For the September 2004 cohort a commercial Bulletin Board downloaded from the Internet was available via the programme website

The Bulletin Board was much more reliable than the previous year's online learning environment, students reported few problems with access to the site, either from the university or remotely. There were some issues concerned with logging on but these did not stop the majority of students from using the Bulletin Board. By the second year, the facilitators had also become more experienced with using online PEBL and the whole GEP programme itself was much more 'bedded down'. The Bulletin Board was seen as easy to use and navigate through, having a clear and simple layout and good facilities including email. In the second year, there was an expectation that students would use the Bulletin Board and because students encountered few technical problems and were

presented with a more positive approach to using online PEBL as a 'normal' part of the PEBL programme, they incorporated the Bulletin Board as simply one of many learning support systems provided by the universities. Aliponga (2003) suggests, "creating instructional materials along constructivist principles provides an important and sound theoretical framework with which to promote learner autonomy. Problem-solving or situational tasks are incorporated within the materials.....and interaction through the Bulletin tool is facilitated among students in such a manner as to bring about more students involvement and greater control over their learning as well as provide more opportunities for them to work collaboratively". By the second year of the project, there was clear evidence that students were using the tasks and the online medium to work collaboratively to achieve the PEBL learning outcomes.

Online socialisation

The first year experience

The training sessions held for students and facilitators at the start of the course were clearly essential and helped in the preparation of both students and facilitators to use the proprietary software package. The information provided in hard copy was particularly helpful. Some negative comments were received from students about their training such as the attitude of some of the trainers and some improvements were made for the following year. However, once the system was technically reliable and quick to use, the training was better. Facilitators found the training helpful but they needed a longer lead in time than they had due to external constraints, and required additional support and training throughout the first year of being an e-facilitator. In addition to helping people learn about using the system, the training was also helpful in encouraging students and facilitators to work in groups and was an important factor in the 'socialisation process'.

The face-to-face PEBL sessions worked very well in forming student groups that work well together and the group notice boards and defined areas on the site were felt to be a very good way of enabling 'private' conversations. The course team were relatively inexperienced in using virtual learning environments, there was little access to e-learning expertise available from within the universities and the facilitators did not form an effective e-moderating group. It was suggested that one of the intrinsic motivating factors would be to introduce tasks to encourage socialisation and involvement with a managed 'threat' of exposure if individuals did not contribute. However, this would have required moderating and supporting online by the e-facilitators. One of the difficulties in the first year of the programme, was that two different professional and institutional 'cultures' were working together for the first time and so socialisation in many areas is still occurring and being defined and redefined. Using the web is just one of many aspects that were being developed on an ongoing basis and producing and enabling a 'community of practice' took some time to be fully realised.

The second year experience

The second year PEBL groups appeared to become socialised more quickly using the online Bulletin Board. The majority of students and facilitators reported that they found the Bulletin Board helped communication between groups' members and also although to a lesser extent, between students and facilitators.

Other positive aspects of the Bulletin Board were the ability to keep in touch especially when the nursing students were on clinical placements, it enabled a useful record of the scenario to be kept and provided valuable thinking time before a response was needed to be given. 82 % of the second group of students said that they acted as "lurkers" or

“social loafers “ rather than directly participating in online interactions. Lurkers can be seen as being passive members of a group, in the same way as some students are in a face-to-face group. Alpay (2005) suggests that this is a sign of students not being committed to the group and lacking enthusiasm and motivation for the group task. This does not seem to be the case with these student groups, as all students appeared to be committed and took part in the presentation. There were periods when the uni-professional programme seemed to take precedence over the students’ commitment to the inter-professional programme eg. when one group had examinations during the time the group was preparing for their presentation. Efforts were made to change the curricula of the programmes so as to stop this occurring.

PEBL could be carried out without an online learning environment, however it is clear that group formation and socialisation is definitely enhanced by having a mechanism for the students to ‘meet’ virtually. It was important for group development and maintenance, especially when students could not practically meet whilst they were on clinical placement.

An interesting development was that the second year group began to use “smileys” (emoticons) on their messages. These were available on the Bulletin Board and helped interpretation of the message that is apparent in face-to-face communication. This reflects the increasing use of texting and instant messaging by individuals as part of their communications with friends, particularly by younger people.

Information exchange

The first year experience

In the first year, some use was made of the proprietary software package as a medium for information exchange. Students and facilitators put up articles and presentations, plus ideas about topics but, because of the technical difficulties and withdrawal from using the online learning environment, many groups used email as one of the main communication media for exchanging information.

The second year experience

Although the Bulletin Board was very effective as a communication means for exchanging ‘conversational’ information, such as setting up meetings and ideas about the scenarios or topic discussion threads, students felt disadvantaged by not having a facility to upload files. They also felt that being linked to the ‘knowledge base’ (Intranet) would enhance the Bulletin Board and that it needed to be enhanced by links to articles and other resources.

Most facilitators still did not actively engage with the ‘e-learning’ nature of the PEBL programme and most of the communications were student-led and student-driven rather than comprising e-moderated discussion topics. However, this appeared to provide students with a good support mechanism for maintaining communications and exchanging information. The second groups were much more innovative in their presentations and this reflected changes made in other areas of the course, for example the Communication skills sessions, so that students were better equipped to include innovative activities such as role plays in their presentations.

In considering the way in which the e-learning environment was managed, some interesting issues are raised by the project, particularly in the light of the passive

engagement of many of the facilitators in the online aspects of the PEBL programme. Jeffries (2002) suggests that there are differences between the way in which technologies are designed and applied which reflect different pedagogical and philosophical approaches to how the learner and his/her autonomy in the learning process is constructed. In some ways, the non-participation of many facilitators as e-moderators, “hosts” or ‘the nucleus of class activity’ in the online medium led to many groups of students taking responsibility for their learning, forming learning networks and using synchronous conferencing without the direct input of a facilitator. These aspects need to be developed further and decisions made as to how to enable learning in future iterations of the PEBL programme.

E-facilitators: Why non-compliance?

The overriding theme from the evaluation of this project was the failure to get the facilitators engaged in the process of facilitating their group using the bulletin board. The lack of facilitator participation in online discussion was commented on by the students and has also been noted in studies by Bishop and Dioron (2004) and Wharrad, Cook and Poussa (2005). Initially the problem appeared to be the difficulty, stated by both students and facilitators, of accessing the bulletin board. But on further investigation, a number of factors may have led to students and facilitators citing the difficulty in accessing the bulletin board when other factors may have been more influential. The bulletin board therefore may have become somewhat of a scapegoat.

At a micro level of change the project required the facilitators to use the new hybrid PEBL model and to promote group collaboration by facilitating an asynchronous online discussion in an inter-professional group. Lewin’s (1951) model of change was used to implement the project. Although change literature indicates that there are a huge variety of change models the programme team was familiar with this model and felt that it provided a clear framework for implementing the change, it is also recommended for brining about change in individuals or groups (see also Hayward, 1996).

The PEBL framework was new to all the facilitators and to the students, but the facilitators were probably required to make the largest shift or change in their behaviour in that they had to use a new framework for their facilitation, were facilitating inter-professional groups for the first time and had to learn to use the online asynchronous bulletin board as a medium for facilitation of the group. All these changes took place in the context of introducing a new programme.

The facilitator training was aimed at getting people to move from their current position or “status quo “(which Lewin, 1951, describes as being ‘frozen’) through the process of ‘re-freezing’. This process generates a new status quo and in this context helped the facilitators to feel more comfortable in facilitating inter-professional groups using the PEBL framework and the online bulletin board. Facilitator training did not explore in any depth the potential differences between facilitating inter-professional and uni-professional groups or of facilitating diverse groups. The programme team was working with experienced PBL/EBL facilitators who were assumed to have covered these aspects as part of their training for the role. The team did not have much lead-in time and so the aim of the initial briefings was to introduce the facilitators to the ‘new’ aspects of e-facilitating. Finally, the programme team wanted to support the facilitators in developing theory and expertise through hands on experience rather than giving them knowledge-based training sessions.

The establishment of the facilitator support group and the facilitators' online Bulletin board were aimed at supporting the e-facilitators through what Lewin terms the 'period of transition'. It was envisaged that the transition period would be managed collectively, and through discussion, the facilitators would be able to get to know each other, socialise, help support and give feedback to each other and begin to internalise and learn the new attitudes, behaviours and skills required for using the bulletin board effectively. This would develop 'situated learning', which is part of developing a community of practice, currently viewed as an essential aspect of organisational development (Smith 2003). It was hoped that the facilitators would see themselves as a group of people with the common purpose of facilitating students' learning using the bulletin board.

A cognitive behaviour model may explain why some facilitators failed to persevere with the use of the bulletin board. At the initial training session, the facilitators seemed very enthusiastic about the bulletin board and the evaluations of this session indicated that on the whole they felt the session was good. Subsequently, the facilitators appeared to have become frustrated by having difficulty in accessing the commercially based bulletin board, or through failing to receive feedback from their students to messages when they had tried to encourage the students to use the group bulletin board. Poor feedback and finding their efforts not being responded to probably led to "expectancy blockage" due to not getting the hoped-for responses from their efforts. This in turn may have led to "displaced aggression" which made the online bulletin boards a suitable target or scapegoat. Finally this led to "resignation", characterised by distrust in trying to continue to use the bulletin board. (2005) Encyclopaedia of organisational behaviour www.cba.uri.edu/scholl/webtexts/encyclopedia.html accessed 20.06.05

In order for people to be involved in macro-organisational change, they need to see and understand the reasons for the change. It is possible that some of the facilitators did not understand the need for inter-professional education. This may have not been in line with their current value systems or the organisational norms of the organisation in which they worked. Taking on the role of e-facilitator meant learning new skills and working with a new framework. This could be seen as a source of insecurity, possibly a threat to their professional identity, and may have led to facilitators being concerned about the 'exposure' of their facilitation methods through the bulletin boards. Although possible benefits of the innovation were the sharing of information and knowledge (Everard and Morris, 1990) the evaluation process may well have enhanced the negative feelings of vulnerability as the two internal facilitators had access to the bulletin boards. PBL and EBL facilitation usually takes place unobserved behind closed doors and therefore no formal record of who said what during the process is available.

Evidence from the 'Hawthorn effect' is that participants respond to factors other than those being observed. "Experimenter effects" may have served to increase the facilitators anxiety about conversing online with their student group and having found it difficult to access the initial commercially produced bulletin board used these as reasons for not participating in the group's bulletin board discussions. These factors, coupled with the instability of the site in the early stages and the emotional labour required during a change process may help to explain why the majority of the facilitators hardly used the bulletin board to communicate with their students and reverted to using more familiar methods such as e-mail, text or telephone.

When implementing a change it is important to share or sell the vision with those who are to be involved in the change. As innovators, the programme team explained what their vision was to the facilitators prior to them taking on the role. Unfortunately, examples of online PEBL discussions indicating how and where the e-facilitator could help the group were not available although facilitators were provided with information and references to the work of Salmon (2001) that included examples of online discussions with students. On reflection, the programme team felt that they might have been able to create some mock discussions to help explain to the facilitators when they were expected to intervene or take part in the bulletin board discussions. Much longer time was required for the staff development and more staff support was needed, indicated by many of the facilitators in the evaluation responses. In the half day that was arranged, only very superficial information was provided and there was little hands-on experience in the team about the role of the e-facilitator and using the bulletin board. The briefing may well have only succeeded in confirming the sceptics' view that knowledge construction can only effectively occur face-to-face.

The time between setting up the system and the students going online gave the facilitators too little time to adequately get to use the system. As innovators or early adaptors, the programme team were unsure of exactly what form the discussions would take. It was not possible to make up a hypothetical discussion when they did not know how the discussion might develop. Despite discussions with the computer department, the programme team believe the IT team was largely unaware of the complexities that would occur in trying to set up the commercially based system for non-traditional use. Previous practice had been for the IT team to put information on the system for each of the modules and the request from the PEBL team to set up a system so that students could provide the information and populate the site was met with uncertainty and some resistance. Finally, although both universities used the commercially produced system, the programme team was not informed that it was unstable although from research and discussion outside the universities, it appears that this is a common problem with the system.

On the macro level, to encourage change the support of the organisation (or in this case the two organisations involved) is needed. The two organisations involved in the GEP were very different in their culture, organisation and infrastructure. In order to sustain organisational change, the change has to be consistent with organisational values (Hatch, 1997) and this change was consistent with the organisational values of the two organisations' stated learning and teaching strategies which note that they value students becoming self-directed in their learning and wish to develop the use of e-learning to support the implementation of the learning and teaching strategies. McFarlane (2003) notes that some British universities trying to implement e-learning have met with fierce resistance from academic staff who feel that technology may take away the purpose of their job which they see is to transmit information to students. Technology is viewed as eroding academic territory particularly by students who do not want any reduction in face-to-face lecturer contact. This is countered by the positive drivers for introducing new technology such as being able to teach more students at a reduced cost and with less reliance on buildings that are expensive to maintain.

The model of face-to-face and virtual experiences aimed to meet the needs both of students and facilitators. The student group developed a variety of communication methods set up by themselves although not all of the facilitator became part of this group. This part of the project confirmed how difficult and time-consuming it could be to

use technology to support student learning and that added skills are needed for online facilitation. The principle underpinning the bulletin board was that students and facilitators would be enabled to develop strategies through online discussions that would help them to construct knowledge rather than be passive recipients as in the transmission mode of learning.

Some of the students had used PBL in their previous degree but for the majority of the students this was a completely new concept, however all the students came to the programme understanding that inter-professional learning was a key and unique feature of the programme. Knowles (1984) and Brookfield (1998) note that according to 'adult learning theory', self-directed learning and group learning are defining characteristics of adult learners. In addition, many students are very familiar with the use of texting and e-mail as a way of communicating with friends. Because of this experience, the degree of change required in the students to use the bulletin board was considerably less than for the PEBL facilitators.

The major differences between the model for the medical e-facilitators and the nursing e-facilitators were the development of ground rules and the reflection at the end of the PEBL tutorial and the length of time between the face-to-face meetings. Ground rules directed the way the groups worked and were supposed to be used as a framework for the group to evaluate their progress and give themselves feedback. The facilitator should have ensured that this process took place. Courneya (2001) who studied PBL groups, found that because the group appeared to be working well, she abandoned the group evaluation and this led to dysfunction within the group. This may have been the case with our facilitators. The groups only had a short time to meet face-to-face and so the meetings were probably focussed primarily on discussion and presentations about the case rather than discussion about the group and its formation. Because the facilitators were deemed experienced at facilitation, the training was aimed at addressing the differences and unique features of the online PEBL programme. The programme team made massive assumptions that the facilitators had skills and knowledge about group dynamics and group evaluation/reflection and would be able to transfer these to the inter-professional PEBL group. Because the facilitators did not participate or even in some cases look at the bulletin boards, the facilitator did not become part of the group.

The project has not yet moved significantly into Salmon's stages of **knowledge construction** or further **development**.

The national context

If this project is considered against the wider national strategy for e-learning, the project aims can be seen to be entirely consistent with achieving national goals. For example, the HEFCE Strategy for e-learning (2005) defines its measures of success as follows:

We consider the HE sector to have embedded e-learning where:

- a. ICT is commonly accepted into all aspects of the student experience of higher education, with innovation for enhancement and flexible learning, connecting areas of HE with other aspects of life and work.
- b. Due to more coherence and collaboration, technical issues have been addressed to give better value for money.
- c. Students are able to access information, tutor support, expertise and guidance, and communicate with each other effectively wherever they are. They are able to check and record their achievement in a form designed for multiple uses to enable personal and professional development.
- d. Tutors have tools for course design to enable better communication between them and their students, giving feedback and targeted support. Individual teachers have access to information about the materials available, and support for continuous improvement of them.
- e. Subject communities are able to share materials in ways that enhance their ability to produce customised high quality courses. They are supported to work collaboratively in designing materials, which are effectively quality assured and widely disseminated. They have access to research information to inform curriculum development and research-based teaching.
- f. Institutions are able to build appropriate infrastructure and resources support for integrating registration and learning functions. They have links with regional networks of institutions to support progression and community involvement.
- g. Lifelong learning networks support connectivity between institutions to provide seamless access for students and staff.
- h. Staff is supported at all stages to develop appropriate skills in e learning, and these skills are recognised in their roles and responsibilities and in reward structures. They have access to accreditation for their level of skills and professional practice in linking learning technology with teaching.

The experience of those involved in this project reflects some of the key aspects of this strategy and highlights some of the operational difficulties of implementing e learning at programme level.

For example, the 'acceptance' of ICT 'into all aspects of the student experience of higher education' (a, above) means those teachers, students and the academic, administrative and technical infrastructures have to be aligned with this as a common goal. Programmes working across organisational, cultural, sectoral and professional boundaries need to work very hard to gain acceptance when there are many competing constraints and pressures on people's time and other resources. Jeffries (2002) notes,

“Key factors in the implementation of a MLE (managed learning environment) are the stockholder’s interest in the organisation, their perceived benefits of the MLE and their power to influence strategy”. Here, there was a real struggle in the early stages for the programme team to persuade other stakeholders of the benefits and once the technological problems emerged, this led to the facilitators and many students failing to engage with the project. There are also tensions between administrative, managerial, and academic and other staff groups, all have different agendas and ‘cultures’ and all of this impact on the development of e-learning initiatives. For example, Land (2001) suggests that “academic developers need to concentrate as much on the barriers to innovation as on the forces supporting it”, using change management techniques such as ‘freezing and unfreezing’ can help to break down barriers to implementing cultural change.

In this project, there was a very short lead-in time for the development of resources and infrastructure, which impacted on the programme itself. There were new learning and teaching strategies being implemented which took into account other government agendas such as implementing inter-professional education. Finally, the two organisations delivering the programme had not previously worked together which made collaboration, although intended, more difficult in practice.

It is difficult to integrate HE with other work contexts such as the NHS when there are technical difficulties such as firewalls or when students do not have access to computers due to their domestic situation. Programme leaders cannot make assumptions that all students have easy access to networked computers at all times even if technical difficulties and incompatibility issues between computer systems have been addressed. The issue of building ‘appropriate infrastructure and resources support for integrating registration and learning functions (f, above) had a huge impact on the first year of the programme where the students’ had difficulty in logging in and led to demotivation to use the online system.

One of the major difficulties in this project was the lack of experience in e-learning of many of the teachers involved in using web-based technology to support PEBL. If we think of the tutors as lying along the ‘novice to expert continuum’, then many of them were towards the novice end of the spectrum. The HEFCE strategy (h, above) indicates that ‘staff (should be) supported at all stages to develop appropriate skills in e-learning’. A range of skills are required by teachers and others supporting student learning if they are to support e-learning effectively: curriculum development skills, e-moderating; designing specific learning materials to encourage, motivate and enhance online learning; skills in designing online assessments and developing an understanding how e-learning can facilitate and be integrated with other forms of learning. Changing the role of the students’ support to incorporate e-learning also requires support from non-teaching staff (such as technical staff) and these too must understand the nature of e-learning. This project highlighted the need for staff development and training to support the programme team, the e-tutors and the technical support staff so that all staff members were employing a consistent approach in facilitating and helping students learn using this blended learning model.

Conclusions

The initial **aim** of this project was to evaluate student and facilitator experience of inter-professional online Problem Enquiry Based Learning (PEBL). The **objectives** of the project were to develop an understanding of inter-professional student and facilitators' experience of using bulletin boards to facilitate PEBL group communication; to generate knowledge about the development, management and use of bulletin boards in inter-professional PEBL groups; to determine whether and how the use of the bulletin board facilitated group dynamics and achievement of the PEBL learning outcomes and to identify staff development needs to support the delivery of the online learning environment.

Due to the technical and organisational difficulties described in the preceding sections, the project focussed not on the actual **learning** that was supported by the online system but more on the experiences of the programme team, students and e-facilitators in working with the technical infrastructure and dealing with the problems encountered in the introduction of an online system to support PEBL teaching and learning.

The overall impression gained from the evaluation was that the PEBL process itself is excellent and students clearly get a lot out of it, both in terms of their learning and also in terms of developing an understanding of working with other professional groups. The students worked well as inter-professional 'teams' and enjoyed these aspects of the programme. The face-to-face tutorial sessions were very much valued and enjoyed and the Bulletin Board that has been developed in response to feedback from the first year's evaluation and which supports the second year of the programme is working well as a means of enhancing and maintaining communication between students in the PEBL groups. Using bulletin boards helps students develop as a team and facilitate learning in terms of providing a mechanism to share work in progress, to collaborate and discuss issues as a group without meeting face-to-face. This is of particular value to enable students to continue working as a group when individuals are dispersed in different locations at various times in the programme.

The project enabled an increased understanding of the issues that facilitated and detracted from the use of bulletin boards. Evidence from the questionnaire survey indicated that using the bulletin boards did help learning and group development once the groups had met in face-to-face sessions although the value of face-to-face communication cannot be under-estimated. Online communications can support but should not replace face-to-face communications in an inter-professional PEBL learning environment because the interactions and issues that need to be addressed are very complex and these are best mediated through face-to-face facilitated small group work.

Any online learning environment set up to support remote participation in group work must enable easy access from all sites, be technically robust and link closely to the organisational Intranet or other online knowledge base. The online learning environment must work reliably and quickly, as students will easily give up if it is not comparable with the commercial sites they are used to and technical support via a helpdesk or similar facility must be available at times when the students are most likely to be using the system e.g. evenings and weekends. Issues of access must be addressed as a priority, particularly to ensure that students and facilitators can access the system remotely from home and clinical practice locations. Some students do not have access to a PC at

home. It would be helpful if this information could be given to students before the programme begins so if possible they can get access to a computer. Students can feel isolated as online learners and so it is important in this programme to ensure that the group has met face-to-face and that an effective and appropriate group dynamic is created. Ground rules for engaging in online interaction should be clarified by the group in the same way as ground rules for the PEBL sessions are clarified and agreed.

In this project, it was clear that once the academic, administrative and technical support infrastructure to manage the inter-professional PEBL and co-ordinate the online learning had been fully established, the online learning environment worked well. Again, it cannot be under-estimated how long the development time needs to be. To establish such an infrastructure, particularly in a complex educational environment, which crosses organisational and professional boundaries is very time consuming

The students are using the bulletin boards more regularly than do many of the facilitators. Although some staff development activities have taken place, in setting up the online PEBL programme, a longer lead-in time was needed to enable facilitators to be trained and to support them in learning how to use and get to know the system before the students started using it. It is vital to train, support and encourage facilitators in using online learning teaching techniques, particularly if they are to act as e-moderators. It can not simply be assumed that individuals will 'naturally' have or acquire these skills, and this particular programme required facilitators to be able to demonstrate a complex mix of skills incorporating learning to deliver a hybrid model of PBL/EBL within an inter-professional learning environment in which nursing and medical students were learning together. These skills were to be utilised in a face-to-face environment and in an online learning environment about which most of the facilitators had little or no experience.

The role of the facilitators as participants in e learning must be clarified and explained to both staff and students by the course team. At the beginning of this project, some of the facilitators were unclear about their role as e-moderators and most had not worked using an online learning environment. Along with clarifying the role of facilitators, expectations of students as participants in an online learning community must also be clarified and explained. In the first year of the project, some facilitators withdrew from the e-learning process. This issue had to be addressed by the course team, partly by training and preparation but some new facilitators were also recruited who were willing to participate actively and appropriately in the online activities. Course leaders themselves need experience and training in online learning environments or need to recruit someone with the experience and time to manage and further develop the process. Facilitators and students must have adequate training and preparation to participate effectively in an online learning environment. The training should include the general use of computers as well as offering specific training in using and facilitating the online learning environment. Facilitators must be given additional support and training as needed throughout the year if they are inexperienced in working in an online learning environment.

Programme teams developing an online learning environment need to clearly define the role and purpose of the online aspects of the learning environment. In this project, the team needed to determine what activities would best support student learning in addition to the face-to-face PEBL tutorials. The Bulletin Board has proved a useful platform but other facilities that would help student learning should include a moderated online discussion group; a facility to post articles, files and include links to other useful websites

about topics and online assessment and/or evaluation so as to encourage and facilitate knowledge transfer.

Some students liked the way in which a 'knowledge base' comprising information about topics via articles, web links and handouts on the Intranet linked to the uniprofessional and parts of the GEP programme. This is an example of integrating learning environments within an organisation. It is also important to think through the types of communications with which students are familiar such as instant messaging as well as providing emoticons and other 'short cuts'. Further research could be carried out to investigate the impact of email, instant messaging, texting and use of emoticons on formal learning environments. It is believed that there a 'cultural lag' between the experience and expectations of tutors and the students who are the 'texting'/instant messaging generation which could be further explored through socio-linguistic analysis.

The online learning environment should 'mirror' the physical learning environment and complement it, in approach, philosophy and delivery. The PBL/EBL scenarios must be carefully developed to meet the learning outcomes in the programme and ensure they are consistent with online learning. Using online learning environments to support EBL/PBL requires review of the scenarios and 'problems' used so that face-to-face communications and online communications can be integrated to support achievement of learning outcomes. In this project, further developments are planned to create an online 'community' which will be very user-friendly and which will encourage students and facilitators to actively engage with the Bulletin Board and promote socialisation. In addition, the online learning environment will be modified to include aspects and information that can only be accessed on line, this was not possible until the technical infrastructure and administrative procedures facilitated access and use of the site. This will encourage motivation to engage with online learning. It may well take a number of years for the PEBL programme to become fully developed as an integrated programme using blended learning approaches.

The findings from this project have raised some interesting issues for the future direction of the PEBL programme and how online learning will be used as part of the programme. The GEP students are clearly a group that are capable of autonomous learning and the future developments planned for the PEBL scenarios coupled with the continuation of face-to-face facilitated sessions will continue to encourage learner autonomy. Tasks which require group work and meetings whether face-to-face or online will be required as part of the programme. The technology whether the commercial Bulletin Board or proprietary software programme is capable of supporting 'automation functions', in which the instructor remains the centre of attention and controls the learning process, either through e-moderating and controlling the uploading of learning materials, or through improving the quality of the information provided to students eg. through materials placed on an Intranet. The technology is also capable of being used to transform, by creating learning networks, using simulations/virtual reality and synchronous conferencing. The latter approach has the student as autonomous learner at the centre of the learning process. In this project, the emergent 'default' strategy seems to be the latter approach and in practice this seems to work well, apart from some minor refinements to the bulletin board facilities to support student learning.

The final conclusions relate to thinking through some of the implications for implementing the national e-learning strategy. This project has highlighted how ICT can be used as a communication tool to enhance group activity in a PEBL programme and also identified some of the barriers and constraints on embedding ICT within

organizational cultures. For any strategy to be effective at operational level it must align with organizational, professional and individual goals and must be appropriately and adequately resourced. One of the key messages from this evaluation is not to underestimate the impact of organizational context, which can generate unstated resistance to implementing change. For example in this project, when introducing a small scale web-based online learning environment but within a highly complex environment composed of two very different universities, two professional groups and two educational philosophies, the potential for misalignment and disengagement with the programme was very high. This was difficult for the programme team at course level to address and issues such as passive resistance by some facilitators, who did not attempt to e-moderate or engage actively with the e-learning environment and issues relating to the technical infrastructure were very hard to deal with. Although the problems for this programme team were exacerbated by the new collaboration between the two universities, there are still lessons to be learned from this project for individual teachers in HE and in health professions in other organisations.

Checklist of actions to set in place before introducing interprofessional online learning

- Select a lead individual or team for the project who understands the impact of e-learning on the organisation and the programme and who has influence at senior level to implement change
- Secure the release of key academic and administrative staff from other roles for development and implementation of the project.
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- Identify sources of funding, however small, to buy in specific expertise and skills where needed (eg. technical authoring, staff training)
- Research into the advantages, appropriateness and feasibility of the online system you are thinking of using in terms of acceptability (by the organization, by students, by faculty) and its particular features that will support the learning you are trying to achieve
- Allow at least a nine month lead-in time for the development and testing of the technical infrastructure
- Identify a lead technical developer to work with the team who understands the learning needs of students and the educational context
- Identify early and train those interested in acting as e-facilitators/e-tutors
- Set up a training programme that includes online learning pedagogy and 'hands on' practice in using the system.
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- Keep **all involved** in the communication loop and decision-making process.

Government strategies as defined by the Department of Health and the HEFCE strategies emphasise e-learning, collaboration between professional groups and between organisations, and developing an 'information age'. The experiences in this project have raised serious questions about the wider implications of implementing the national e-learning strategy and the impact on higher education institutions. We would ask whether we actually have the expertise and capacity within higher education institutions and the NHS to develop and deliver effective and appropriate e-learning in health professions' education?

The question also needs to be addressed as to whether appropriate resources will be made available to universities and their NHS partners at all levels to support the curriculum and staff development required. This includes developing a critical mass of expertise in 'e-teaching' and educational web development to support and promote e learning in the complex rapidly changing environment in which we find ourselves. Given the 'cultural lag' in using technology, particularly in relation to communications differences between students and teachers that has been identified, investment in staff development is vital if teachers are to be equipped to participate actively in e-learning environments.

Summary of lessons learned from the project

- Those leading an e-learning project need to be themselves skilled and aware of many of the issues involved in running online learning programmes through training and development
- Organizational issues, such as resistance to implementing change, need to be fully explored and addressed
- When introducing online learning, the nature and purpose of the online elements in terms of how they will support learning need to be made very clear and explicit
- As much lead-in time as possible needs to be dedicated to testing the technology, training and briefing staff and producing support and help facilities for all those using the technology
- The technology must be easy to use, accessible (both on and off site) and designed to support the learning or communications that are expected to take place. It must also look up-to-date and be fast so that students are not put off using the site
- Help facilities need to be in place especially in the early stages of a programme that uses online learning
- Online systems used in one programme should be fully integrated with the main IT systems and features so that students and staff do not have to use multiple accounts or log-ins (the 'one click' approach)
- Define quality assurance and other needs from the system at the start of the project so that they can be built into the design features eg. log-on statistics

- It is easy to make assumptions about the expertise of staff and the transferability of skills into other arenas such as e-moderating. The importance of training, development and ongoing support (in both pedagogical and technological terms) cannot be underestimated
- Issues of 'generational lag' between students and teachers intervene in learning and communication processes, students are much more au fait with texting and using different forms of technology for communication than teachers tend to be
- Online features such as bulletin boards can help to support face to face teaching and learning, however it is not always easy to identify the specific learning that takes place, they are especially useful to help groups to communicate and keep in touch when on work placements and other off-site activities
- Motivators (such as essential documents or assessment tasks) need to be built into the learning that relies on online systems so that students will use the site regularly and become accustomed to using the features

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