

[O12] Blended Learning in Forensic Pathology – *the way forward?*

Professor John Cassella¹ and Mrs Sally Cassella²

¹Department of Forensic Science, Faculty of Science, Staffordshire University, Mellor Building, College Road, Stoke on Trent, ST4 2DE. [J.P.Casella@staffs.ac.uk]

²Faculty of Education, Health and Sciences, University of Derby.

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Abstract

The rise in the public interest in Forensic Science, essentially due the media, has seen a continual rise in the numbers of undergraduate and postgraduate forensic science courses and student applications in the UK. This continues to be pedagogically challenging to academic science departments, due to increasing student numbers and also in part to the criticism of course content and real-life applicability; criticism that comes mainly from its *own* industry. University forensic science departments require staff bases which bring traditional academics, together with forensic practitioners, who are involved in some way, with the development and delivery of forensic science.

From the pedagogic perspective, teaching forensic science can be problematic. Finding sufficient, realistic and informative scenarios for undergraduate teaching is a challenge. This challenge is compounded when teaching the topic of forensic pathology. Gaining access to *post mortem* facilities, images and the details associated with forensic pathology that give the teaching content its necessary context, is essential for robust teaching and learning.

With these considerations in mind, a structure of blended learning would initially appear to be an appropriate methodology, following the widely used medical model. Using a combination of video (mp4) and audio (mp3) coupled with more traditional laboratory and teamwork exercises, the topic of forensic pathology has been taught to final year undergraduate forensic science students. All work presented was either audio or video recorded to facilitate self-reflection or group reflection. The opportunity to allow students to be autonomous learners in their own time, using technologies that they are familiar and comfortable with, would appear to have been successful from student feedback obtained. However, an interesting outcome of this work was that *many* students reported a preference for a more traditional face-to-face approach and that the use of technology, may be in some instances, be perceived by them to be a hindrance to their learning.

This is an interesting finding when considering the role of virtual learning environments (VLE) for some subjects/topics. The concept that VLE is a solution to the problem of 21st Century delivery and assessment may not be valid in *all* situations. This is more of an issue now, than ever before, compounded by the fact that material can be spread across a number of platforms and sites which academia is struggling to keep up.

Introduction

The true understanding of the paradigm of physiology and the subtleties of anatomical structure is only reached through an understanding of pathological processes. Clearly therefore, from a pedagogical and from a business perspective, there was an opportunity to create and develop a short 'pathology - forensic pathology' course for delivery to a wide diversity of biological, forensic and allied-health related courses at the University and potentially outside of the University to Regional Health Trusts.

The need for a provision of such a course to the allied health professionals is clear; their understanding of disease processes will ultimately assist them in the treatment and indeed prevention of disease. For undergraduate forensic science students, this course would act as a natural developmental stepping place from basic human biology/physiology, studied in the first year of a

course and help it to link more appropriately with final year disease oriented modules available in the final year of undergraduate study.

There is a clear requirement for forensic science students to have a basic yet robust understanding of pathology in order to assist them in better interpreting a crime scene or potential crime victim, as opposed to an individual suffering from an organic/pathological illness.

Initially, the course was developed for final year undergraduate students. This paper outlines initial experiences with the development of the course, and examines issues relating to learning and teaching arising out of this experience.

Development of the course

Discussions with local pathologists and Biomedical Scientists at the local NHS Trust hospital confirmed the feasibility of a training course, which would combine the rigour of academic study of relevant theory with practical input from experts in pathology. The course would be suitable for development for undergraduate and postgraduate study, and also demonstrated outside market potential.

This Forensic Pathology course could be further developed into a detailed examination of selected body systems, pathology and forensic investigation with Court reporting of findings. Such a course is considered highly attractive as part of ongoing 'Continuing Professional Development' for doctors, nurses, paramedics biomedical scientists and other allied health and legal professionals.

To maximise the quality of learning, and offer flexibility for study, it was agreed that the course should be developed using a 'blended learning' model. However, it seems that there is no single 'official' definition of what 'blended learning' is. Kerres and De Witt (2003) noted that many authors have described approaches to 'blended learning' comprising various elements, but none "propose a prescriptive model as to when and how these elements are to be included in a learning environment". They recommend a balance between elements, because too much weighting on a single element often leads to failure, "because they are not able to deliver the rich experience that is essential for successful learning".

Boyle (2005) suggested that different definitions of 'blended learning' arise from the different motives that underpin the introduction of such an approach, whether pedagogical, commercial or to 'update' a course. It was proposed that the 'blend' should be developed into a form that is suitable for the specific needs. "The introduction of a new blended learning environment can be treated as a form of action research. The aim of the evaluation is to inform the team which innovations were effective, where there were problems, and how these might be dealt with".

The introduction of the course as a single, undergraduate module in the first instance would allow exposure of students to the perceived benefits of this approach to learning, and also allow for detailed evaluation of the outcomes of the course, from the perspective of the learners and tutors.

In addition, it was agreed by the development team, that a 'Problem Based Learning' (PBL) approach would be valuable for a course of this nature. In PBL, problem-solving is integrated with the learning process to enhance self-directed learning and problem-solving skills, which are essential components of professional competence (Dahlgren *et al*, 1998). The use of 'real-life' situations would place the learning of pathology and forensic pathology in context.

It has been shown that the PBL approach produces more motivated students with a deeper subject understanding, encourages independent and collaborative learning, develops higher order cognitive skills as well as a range of transferable skills including problem-solving, group working, critical analysis, lifelong learning and communication (Miller *et al*, 2004).

This strategy is a student-centred method of instruction that is based on developments in cognitive learning theory and results from classroom research that suggest most students experience improved learning when they are actively engaged, working together, and given the opportunity to construct

their own understanding (Kumer and Nataragan , 2007). This method emphasises that learning is an interactive process of thinking carefully, discussing ideas, refining understanding, practicing skills, reflecting on progress, and assessing performance.

It has been suggested that there has been a noticeable increase in demand for problem based learning combined with 'Virtual Learning Environment' (VLE) mounted resources from a more technologically aware student body (MacArthur, 2005). However, there is some degree of concern regarding over-reliance on the VLE, given that one of the reasons for failure of e-learning is considered to be feeling of isolation, and the need for some face to face interaction for success (Race, 2005). It was considered by the team, that a blended learning approach may help to overcome this concern. Bober and Dennen (2001) indicated that students in a blended learning environment work better collaboratively on-line due to their experiences of working together face to face.

The course was therefore developed to combine on-line study of theory with contact-based sessions including practical, expert presentations and peer presentation and discussion.

Course Content

The **Learning Outcomes** for the course were as follows:

- To demonstrate a critical appreciation of information, both written and pictorial, relevant to forensic pathology
- To critically analyse information from a forensic pathology environment to assist in the determination of a probable cause of death
- To demonstrate a level of critical knowledge of forensic pathology techniques, and be able to apply that knowledge to an appropriate level.

The course was constructed such that learners would access video material relating to the post-mortem process, and its role in pathology. This material consisted of four separate components, spaced throughout the course at appropriate stages. This material also served the purpose of refreshing learner's knowledge of anatomy, in preparation for a dissection practical during the course. In addition, they were aware of the procedure that would be followed when visiting the mortuary to observe a post-mortem procedure.

The 'problem based' component of the course focused upon 'real-life' crime scene images. Students were required to work in small groups to analyse these images, and to research possible causes of the types of injury or scenario represented, natural and unnatural. Suitable sources of background reading and information were suggested as an aid to study, although learners were encouraged to locate additional suitable resources. Small group discussion of each crime scene image would enable learners in identifying areas of knowledge that they needed to develop in order to offer a possible explanation for the scenario presented. A short report was to be produced for each set of images which would receive formative feedback. Larger group tutorial sessions would encourage sharing of learning and allow for peer-peer formative feedback. Copying of images was not allowed, although annotated line drawings of the images was encouraged. This approach has been employed in a prior study with successful outcome (Cassella *et al*, 2007).

Students would access underpinning theory relating to 'Body systems' and pathologies on-line. Using such computer assisted technology to grasp basic aspects of theory from a 'problem-based' learning directive, the 'students' would progress to the 'real-life' examination of the pertinent body system under investigation, at the mortuary of a local hospital and through histopathological microscopic examination of body tissues under the direction of a Biomedical Scientist.

The inclusion of a dissection practical session (using waste animal material from the food processing industry) would allow hands-on application of theory, and promote understanding of the structural relationships between tissues.

This practical session would also allow experience of photographic techniques suitable for recording the process.

The group-based study of contemporary issues in forensic pathology, leading to a presentation would further encourage critical evaluation of published material, and distillation of relevant information to construct a coherent resource for members of the larger group. Groups were allocated a topic at the start of the course. This presentation formed one element of the summative assessment for the course.

The second element of assessment was a written report relating to the analysis of a crime scene image. This was to be completed under a time constraint, to represent a 'real-life' scenario.

Students were encouraged to build-up a reflective portfolio of learning throughout the course. This would not only facilitate their completion of the summative assessment but also it would act as a useful document to demonstrate their experience during interview for further study or employment.

Practical sessions, presentations and discussions were all video recorded for the purposes of self-assessment and reflection.

Experiences of delivering the course

From the tutors' perspective, this course offered a variety of learning experiences which aimed to cater for a range of learning styles and approaches, given the diverse nature of the cohort. The inclusion of 'experts' in delivery of material, as well as 'university academics' was seen as very valuable in reinforcing how theory is applied in the 'real world'.

The shift from 'teacher' to 'facilitator' was initially challenging, but offered the opportunity for learning *with* the group. The use of video recording was carefully considered, as some find it quite intimidating. However, it seemed that this actually encouraged engagement of all members of the groups.

There was a good deal of positive feedback from the learner's perspective, comments included the following:

- "Really enjoyed the module – found the teaching methods innovative"
- "Practice at presenting to peer cohort beneficial"
- "Enjoyed the dissection practical"
- "Enjoyed the 'real-life' situations presented in the Crime Scene Images"
- "The post-mortem DVD's were good"
- "I hated being videoed to start with, but I found it really helped me to see where I could improve"

However, there were also some behaviours and comments that offer opportunity for further reflection and development.

Despite explanations in the first session, and in the course handbook relating to how the course was organised, using the blended learning/problem based learning approach and that contact sessions would only occur where indicated, the tutors were regularly contacted to ask about 'this week's lecture'.

Several learners attempted to 'complete' their study of all of the crime scene images in a single sitting. This did not allow for effective use of formative feedback. When offered an explanation of the reason for 'spacing out' the study of these images, some learners were comfortable with revisiting the images in the light of feedback, whilst others remained resistant to this approach.

Tutors received e-mail correspondence and direct comment from a number of students who felt that they were not being 'taught' what they needed to know about forensic pathology.

A significant number of members of the cohort indicated they would have preferred 'traditional' delivery of specific pathologies, which they would then be 'tested on'; Interestingly, these students did relatively less well on the module.

Discussion

It was hoped that the use of a 'blended learning' approach, incorporating some principles of problem-based learning would encourage more active learning; allow greater tutor contact time with smaller groups; better cater for diverse needs and learning style preferences; offer more regular feedback through the module; encourage reflection on learning for self-improvement and hopefully produce graduates with a good basic knowledge and understanding of common natural pathologies and forensic pathology.

For many members of the cohort, this could be considered to be an accurate assessment. However, some learners struggled with this approach to learning.

Although the cohort did contain some learners with greater life experience, the majority have recent experience of primary and secondary education which is largely tutor-centred. Progression through tertiary education, in theory, increasingly requires students to learn through a more active and independent mode. The lack of prior experience to acquire and practice independent learning skills may pose a barrier for many undergraduate students to learn through an independent and problem-oriented approach.

The introduction of problem-based learning approaches, coupled with a blended learning model offers many potential benefits. However, where learners' main experience has been of a more 'traditional' approach to teaching and learning, making this transition may present difficulties for some.

The suitability of the approach adopted may perhaps be questioned, given some of the less positive responses. However, there is a drive towards increasing use of web technology in Higher Education, and in most institutions it seems an 'expectation' that courses are developed to utilize this technology.

Leclerque and Denis (1996, cited in Denis, 2003) stated that to be a learner in a blended learning environment requires the student to be a 'good self-learner'. The question arises of whether you do 'need to be a good self-learner' or whether blended learning offers the opportunity to encourage the development of 'self-learning'. Baume (1994) indicates that learner autonomy is desirable for the most effective learning to occur. The use of a 'blended learning' and 'problem based learning' approach to promote learner autonomy could be considered a valuable addition.

Newer entrants to the teaching profession in Higher Education are now encouraged, or even expected, to gain a 'certificate of professional practice' or similar for teaching in Higher Education. These practitioners are encouraged towards innovative teaching techniques, and develop skills in reflective practice as well as an appreciation of contemporary theories relating to learning, teaching and assessment; approaches to learning; and learning styles. It is those with a teaching qualification who are most likely to be open to investigating alternative approaches (Lueddeke, 2003). There is, maybe, a need for caution where such innovative techniques are introduced against a background of traditional 'didactic' teaching in the programme team.

Suitable support mechanisms could be introduced, to orientate students to this different approach to learning. Denis (2003) stressed the importance of knowing whether learners have the technical skills to use the platform through which the e-learning content is delivered. Given the diversity of backgrounds of learners, consideration should perhaps be given to the inclusion of skills development for the use of e-learning materials, possibly with an element of 'self-diagnosis' for learners to recognise their own requirements in this area.

Some developers of e-learning materials incorporate an on-line discussion element. Students may be encouraged to engage with difficult topics outside of the classroom. This might allow some students who are disengaged in the classroom to have time to reflect and develop the confidence to engage in

the topic on-line (Aspden and Helm, 2004). However, Cox *et al* (2004) found that students involved in synchronous on-line discussion were disappointed in not meeting the tutor face to face. Students also identified a need for the content of discussion to be directly relevant. In addition, students with English as a Second or Other Language may be at risk of being 'left behind' in such discussion. There is also the possibility of good typists dominating conversation (Bober and Dennen, 2001). However, with development in Web 2.0 technologies offering possibilities such as Wikis and Blogs, some of the problems with synchronous interaction are overcome. In addition, these tools may offer an alternative, and enhanced experience for on-line collaboration in group work.

Prosser (2004) noted that students have difficulty in understanding what PBL courses are about, and that even within the same class; students have different perceptions of what PBL is about, "We need to provide our students with substantially more support in developing their understanding of what PBL is about".

A review of the schedule for the module, to include greater 'contact time' at the start of the course, with more independent study at a later point may improve the experience for those students who may otherwise feel 'abandoned'. This would also allow a period for introduction of the principles of 'problem based learning' with some shared class-based exercises to model good practice.

Ongoing developments include considering student representation, through, for example focus groups and questionnaire based study, to more accurately identify strengths of the adopted approach, areas for development/change and the type of support that would be valued by students when encountering this approach to learning for the first time. The addition of Wikis or Blogs as a tool to enhance collaboration is also under investigation.

In further developing this type of course for delivery to other audiences, it will be necessary to consider their prior learning experiences, in order to identify the level and nature of support they are likely to require in order to engage effectively with this approach to learning.

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Figures - left and above : An aspect of learning that requires attendance, but video recording of the event allows for subsequent reflection, individually and as a group using on-line discussion forums.

Figures below: Interpretations of the head injuries from forensic photographic evidence. The similarity of information presented in the 2 images demonstrates that group understanding is equivalent.

