Advanced training in emergency medicine: a pedagogical journey from didactic teachers to virtual problems

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Background: As trainee numbers and the geographical spread of training departments have increased, the model of weekly face-to-face teaching has come under strain because of long travel times. This has been compounded by a reduction in the total number of hours worked by trainees. Furthermore the traditional teacher centred educational programme has been challenged as unfit for purpose on grounds of both content and style.

Objective: This article describes two shifts in the delivery of the programme. The first involved migration from a didactic delivery to a problem-based model; the second a gradual shift to the internet culminating in implementation of a web based virtual learning environment.

Conclusion: The principles outlined in this paper are widely applicable and will be of interest to all clinical educators within the specialty, both within the UK and overseas.

There is increasing emphasis on the need to quality assure medical teaching both by delivering content defined by national curricula and also by providing evidence that this teaching has occurred and been effective. This is challenging in any setting, but particularly in specialties like emergency medicine in the UK where regional cohorts of specialty higher trainees work shift patterns and are dispersed to hospitals over a wide geographical area.

The North West emergency medicine specialty training programme (Specialty Training in Emergency Medicine—STEM) has been preparing trainees to pass the specialty exit exam since the onset of specialist registrar training and was initially very successful. However, in recent years, with increased trainee numbers and consequent greater geographical spread, the model of weekly face-to-face teaching sessions has come under strain because of long travel times. This has been compounded both by a reduction in the total number of hours worked by trainees and also by the need to ensure that shift rotas comply with the requirements of the European Working Time Directive (EWTd). Furthermore the traditional teacher centred educational programme was challenged as unfit for purpose by the trainees who felt that both content and style were suboptimal.

From an educational perspective we have also seen a shift away from behaviourist models of learning towards social and constructivist learning pedagogies. However, the geographical and chronological dispersal of trainees has often meant that it is difficult to develop learning networks to support such a change. Indeed, it could be argued that changes to working practice have suggested a need for independent and individual learning whereas educational theory has increasingly expounded the adoption of a more constructive and collaborative approach that requires intellectual and social interaction between learners. From a pedagogical perspective we are advocates of a blended approach to learning, picking the right pedagogy for the task required. However, in practice, the reality of emergency medicine practice—that of discussion, constant development, rapidly shifting knowledge base together with a high degree of necessary interpersonal discussion and debate—means that we have developed as social and constructivist tutors.¹ This means that we place great emphasis in assisting individual and groups of learners to educate themselves and

others and to allow them to develop their own thoughts and solutions. Online learning offers a variety of approaches,² but we believe that group interaction and social learning are essential for effective emergency physician education and development.

This article describes two shifts in the delivery of the programme: the first involved migration from a didactic delivery to a problem based model; the second a gradual shift to the internet culminating in implementation of a web based virtual learning environment (VLE).

WHY PROBLEM BASED LEARNING?

Problem based learning (PBL) supports the key elements of adult learning. PBL has been extensively debated elsewhere.^{3–5} The seven step Maastricht method of PBL used in Manchester⁶ requires the same group to open and close a case. This allows the learners to both identify problems and then answer them as a team.

PBL is widely employed in UK medical schools and has attracted increasing interest at postgraduate level as it allows a senior group of clinicians (the trainees themselves) to take control of the specific educational content of each session while the course designers retain overall control by specifying the content of the cases for discussion. This promotes professional team working within the groups and allows them to focus and develop their own ideas and solutions.

DESIGNING AND DELIVERING A PBL COURSE

Initial core content for the North West PBL programme was developed around a series of meetings between trainees and trainers that took place before the publication of the original FFAEM curriculum. Content was generated and refined with the aim of creating a succinct series of learning modules which best reflected common and/or important clinical scenarios and problems in everyday practice.

These discussions resulted in the design of six distinct clinical modules as shown below:

Abbreviations: EWTd, European Working Time Directive; FCEM, Fellowship of the College of Emergency Medicine; FFAEM, Fellowship of the Faculty of Accident and Emergency Medicine; PBL, problem based learning; STEM, Specialty Training in Emergency Medicine; VLE, virtual learning environment

Figure 1 Screenshot of a PBL Moodle session on St Emlyn's.

- Advanced management of acute medical emergencies 1
- Advanced management of paediatric emergencies
- Advanced management of trauma emergencies
- Advanced management of surgical emergencies
- Advanced management of acute medical emergencies 2
- Advanced management of psychosocial emergencies.

With the publication of the FFAEM (now FCEM) curriculum,⁷ content was reviewed to establish mapping to national learning requirements and to benchmark STEM's quality assurance.

The six 12-session modules run over a 3 year cycle. Each session contains one or two cases for discussion. The cases are designed to guide students to consider both clinical and managerial aspects of emergency medicine practice in accordance with good PBL case design.⁸

Based upon the geographical spread of the region, three subregional learning groups were established, each following an identical programme track such that trainees from across the North West are each at the same stage in the STEM cycle. These groups meet biweekly throughout the year and each PBL session lasts 2 h.

WHY MOVE TO THE WEB?

Initially cases were written and distributed on paper. Soon the distribution was by email, but the fundamental method of sending cases to each of the trainers and trainees was unchanged. As could be expected, significant numbers of participants forgot their papers or left significant parts behind, and this could detract from the delivery of the sessions. It was realised that a website would allow equity of access throughout the region and would also allow the inclusion of higher definition supporting materials such as x rays, videos and sound files. The website (www.stemlyns.org.uk) was funded through the National Health Service Modernisation Agency and is still, to our knowledge, the only hospital built with government money, on time and within budget.

Despite the improvement in access that resulted from a move to the web-based case repository, the trainees' work patterns continued to be a barrier to universally effective PBL, or indeed any learning modality that demands physical presence for all.

Such problems are not limited to emergency medicine. The majority of the analysis, classification and formulation steps in the Maastricht model take place in face to face sessions. Members of the group unable to attend face to face sessions were therefore unable to fully take part. In effect this meant that only a minority of trainees were able to participate and therefore benefit from the discussions in a face to face manner.

In an attempt to facilitate fuller trainee interactivity and remove the barriers inherent in the original St Emlyn's model, we migrated the PBL course into an open source course management system, Moodle, in 2006. VLE systems such as Moodle offer a wide range of information and activity types. The requirements to facilitate PBL are limited and easy to set up, and comprise the tools needed to facilitate asynchronous communication, content delivery, internal and external web links and feedback modules. This is shown in fig 1.

The VLE allows everyone to benefit from teaching even if unable to attend a face to face meeting. Learning outcomes can be developed in the meetings or online, and reporting can be delivered via the discussion boards to allow all members to benefit from the work of the group. This allows even those who were not present to take part. Passive learners can observe the construction and dialogue and still gain and learn from the case based discussions. In this way all members can collaborate and construct solutions to the problems posed by the PBL group. In addition, the course tutors can see the activity of the group, take part in the discussion as a co-learner, and facilitate if required. The tacit educational benefits for VLE tutors are significant in themselves.

Our current model has sub-regionally based trainee groups who meet both face-to-face and virtually. A tutor is still allocated to facilitate each of the face to face sessions but there is relatively little interaction between tutors and trainees online. The variability of a need for virtual tutor interaction on a day by day basis arguably reflects the seniority of the trainees, their inherent motivation for learning and their familiarity with PBL teaching. Other online PBL courses aimed at students have required a much greater tutor presence,⁹ with a greater need of facilitation than in traditional PBL, but we have not found this to be necessary. While much of the e-PBL system is self supporting, a team of two consultants oversee the virtual environment for each module.

THE FUTURE

The courses are currently aimed at specialist registrar training, but will migrate without modification into ST 4–6 training under Modernising Medical Careers in 2007.¹⁰ The precise year at which a trainee joins the programme is not materially relevant since all trainees remain in the teaching groups for at least 3 years and will therefore complete each module at some point before the end of training.

VLEs are only one element of a comprehensive educational approach and have well-recognised limitations.¹¹ Care must be taken to address other aspects of education that cannot be delivered via the web. For example, practical skills, history taking, attitudes and interpersonal relationships are best taught at the bedside with a skilled tutor.

We have recently augmented the established VLE package with a series of competency-based skills which are learnt and taught in small group format alongside the cognitive (knowledge based) course elements.

Trainees acquire skills confidence based upon the established “four stage” approach to psychomotor learning. Subregional meetings allow hands on practice based upon standardised competency documents which are made available to trainees in advance of each session. Within each session, a designated skill, drawn from the skills bank, is chosen for practice.

The guides are in a downloadable format, are mapped to the OSCE requirements of the FCEM diploma, and can therefore be used as a written record and revision aid by trainees in preparation for speciality examinations. It is vital to remember that e-learning is simply an additional tool for emergency medicine education, it cannot and should not entirely replace other media.¹²

Although the focus of the PBL courses is the education of the trainees, the information sought, appraised and disseminated online by them is just as valuable to the trainers. A further advantage to the VLE facilitation is that this information can be easily shared, and that all trainers can be made aware of the core STEM training and the individual skills that are the core of emergency medicine practice.

SUMMARY

Our experience in developing and delivering a VLE PBL course for senior trainees in emergency medicine strongly supports the idea that VLE is a necessary core element of effective medical

education in the emergency department. Furthermore, the VLE can be used as a focus for skills training in a blended¹² approach to professional education.

If you want to know more then please contact us by email or letter. You can also visit one of the links below where you will be able to see demonstrations of the courses and learning.

- Moodle: <http://www.moodle.org>
- StEmlyns virtual hospital: <http://www.stemlyns.org.uk>

Most courses on the StEmlyns site require a password to enter, but you can view the “Getting to know Moodle” course and the demo course, which will illustrate key features of the system.

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