A STUDY INTO POSTGRADUATE MEDICAL STUDENTS ENGAGEMENT WITH VIRTUAL LEARNING ENVIORNMENTS FOR TRAINING IN EMERGENCY MEDICINE

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Abstract

This study assessed the utilisation of a Moodle based virtual learning environment (VLE) by junior doctors training in Emergency Medicine and in turn their learning styles. Results showed that 68% of the subjects accessed the VLE frequently in the first two months of their training but did not continue to access the resources after this. The most accessed resources were the video lectures: 38% of the junior doctors viewed them more than 3 times with 75% stated this was to review a specific part of the video.

Background

Virtual Learning Environments (VLE) are commonly used for Undergraduate study with 95% of institutions using VLEs in 2005 (JISC, 2005). Most of the students will be using VLEs for accessing lecture notes and seminar questions (Lovatt et al., 2007). Although there are a high number of institutions using VLEs, there is a need for further research into whether they actually encourage deeper learning (Rogers, 2004). Studies into undergraduate students' engagement with courses that rely more heavily on VLEs have generally suggested that the students do find the VLE useful and like this method of accessing class material. However, these studies also discuss how students' engagement with the VLE decreases over time (Love & Fry, 2006). Similar studies in postgraduate students' engagement with VLEs suggest comparable results (Fairhurst, 2003).

After gaining a degree in medicine at University, junior doctors are required to further their medical knowledge through general and specialist clinical training (Barlow et al., 2010). This involves rotation through different departments with training including traditional teaching and shift work in the department itself.

In the last decade increasing demands and responsibilities have been placed on medical educators, leading to a reduction in the time being spent on teaching (Jorge et al., 2006). The impact of the European Working Time Directive,

introduced in 2009, has also reduced junior doctors' maximum working hours (Temple, 2010). This has caused concerns amongst NHS managers that junior doctors will not receive satisfactory training (Pickersgill, 2001).

In 2007 a study reported only 30% of junior doctors in emergency medicine attended their weekly tutorial, which in turn left the teachers disheartened and less committed (Carley, & Mackway-Jones, 2007). Research by the Department of Health has suggested that a possible solution to this would be to incorporate e-learning into training programmes (Davies et al., 2007). E learning offers flexibility through asynchronous delivery enabling learners to control content and manage the time and pace that they view and engage with the curriculum content (Patrick et al., 2009).

The Southampton Emergency Medicine project (SEMEP) aims to change the way junior doctors in the Emergency Department engage with their postgraduate medical training by moving away from the traditional lecture delivery towards a more blended approach (Barlow et al., 2010). The blended approach allows for more flexibility without losing face to face contact. This enables a wider choice of resources and modalities (Reynolds, 2010).
The SEMEP VLE used in this study had 15 modules. The modules included video lectures, specific quizzes for the junior doctors to test their knowledge and links to resources that contained more information on the topic. Additionally, junior doctors attended weekly seminars where they discussed the material presented in the modules with a senior.

This study aimed to analyse the way in which the junior doctors engaged with the SEMEP VLE in order to evaluate how effective it was as a resource for blended learning. It also aimed to look into the learning strategies the subjects applied to the blended learning programme. This part of the study focused on whether the subjects used deep learning techniques for understanding the course content. This was then compared to their methods for acquiring knowledge for answering clinical bedside questions.

Method

The study focused on two sequential groups of junior doctors training in emergency medicine. Each group's placement in the emergency department lasted for a six-month period. The subjects met once a week for a face-to-face seminar but were also asked to engage with the SEMEP VLE.

The following areas of engagement with the VLE were analysed using the Moodle statistical analysis tools:

- Total average frequency that the subjects accessed each module
- Frequency that individual subjects accessed each module
- Frequency and time both cohorts accessed the VLE whilst training

A questionnaire was also given to the junior doctors to establish their utilisation of the video lectures, resources for studying and resources for answering clinical questions they came across on ward rounds.

Engagement with Moodle

Moodle provides several methods for analysing engagement with the content and resources uploaded by tutors. This ranges from tracking individual students access of each resource to statistics and graphs showing all users' engagement. Two of these methods for measuring engagement were used for this study.

The first method of measurement was a participation report. This tracked how many times each student accessed each module. The data was then anonymised and the access information was placed in a table.

Table 1

Analysis of Junior Doctors Participation With Each Module

Module / Student	1	2	3	4	….	12	13	14	15
1	7	8	2	5		1	2	0	0
2	2	6	8	2		0	1	0	0
3	3	0	0	0		0	0	0	0
…									
47	0	5	0	2		0	0	0	0
48	9	6	3	4		0	0	0	0
49	12	2	3	2		0	0	0	0

The second method of measurement was the Moodle statistics tool. This gives a graphical representation of engagement for a selected period of time. The tutor can select from one week to one year and also the engagement of different users, that is. tutors, administrators, etc.

Results

The utilisation of the SEMEP VLE was analysed for a period of one year. In this year two teaching groups (a total of 49 students) used the resources. The second teaching group (12 junior doctors) also answered a questionnaire, which discussed specifically their utilisation of the video lectures and resources other than the SEMEP VLE.

Data Analysis

Figure 1 shows the two cohorts' overall engagement with the SEMEP Moodle site. The first group used the VLE frequently in the first two months of their course. Access decreased during the middle of their course and increased again slightly just before the end of their training. The second cohort again used the site frequently in the first two months but access was minimal after this point. This initial result would suggest that the majority of subjects were viewing all of the resources at the beginning of their training. This would

suggest the junior doctors deem it necessary to learn all of the teaching content at an early stage of their placement.

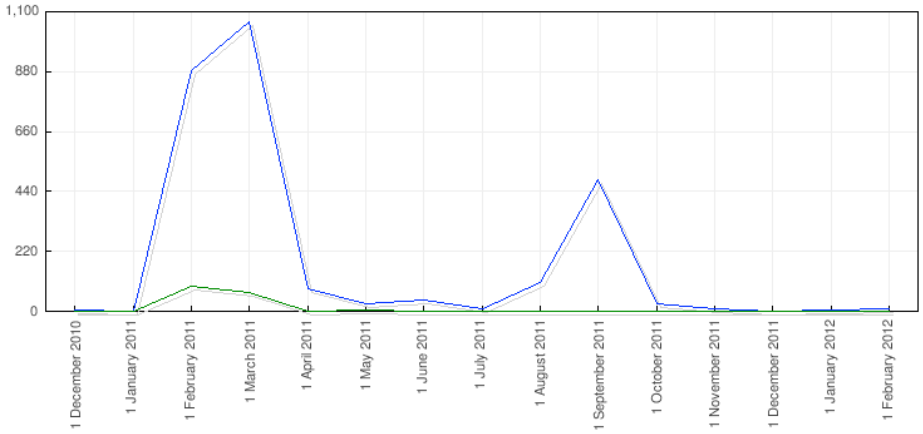

Figure 1. Junior doctors' engagement with SEMEP over one year.

Figure 2 shows the results from the questionnaire regarding the frequency the junior doctors accessed the video lectures. The results show that 38% of the junior doctors who took part in the questionnaire watched the videos more than three times. A total of 76% of the junior doctors watched the video more than once. This suggests that the majority of subjects were trying to memorise what it said in the lecture.

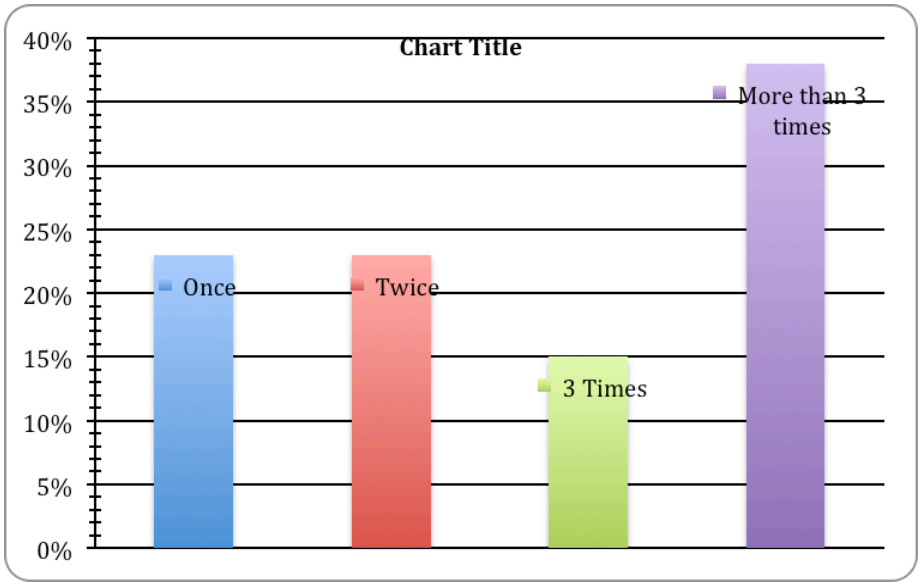

Figure 2. Frequency of video access.

Figure 3 shows that 75% of junior doctors that watched the videos more than once wanted to review a specific part of the video. This correlates with the idea that the subjects are trying to memorise specific information in the lectures.

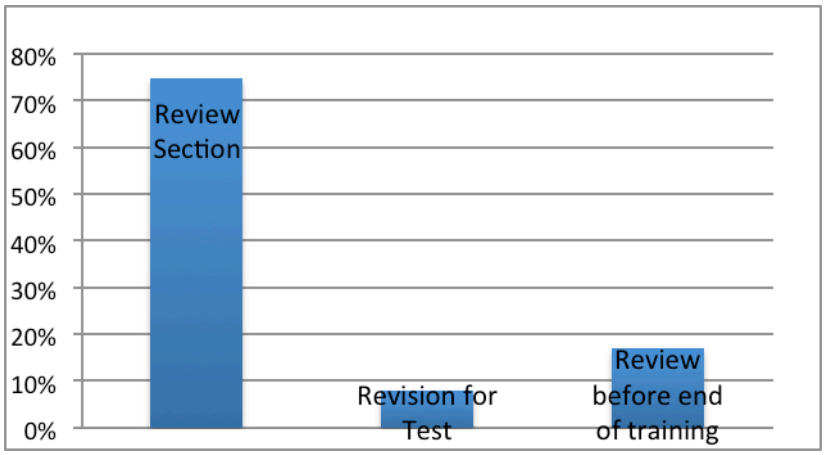

Figure 3. Reasons for viewing videos more than once.

Figures 4 and 5 show the frequency in which two subjects were accessing the SEMEP modules. Figure 4 illustrates that this junior doctor accessed the majority of modules more than five times, with a peak of twenty-five times. Figure 5 shows that this subject accessed most modules at least twice with a peak of eleven times. These figures were not uncommon with 63% of the subjects accessing at least one module more than 4 times. This suggests that the junior doctors are trying to gain as much knowledge as they can from these modules within the first few months of their training.

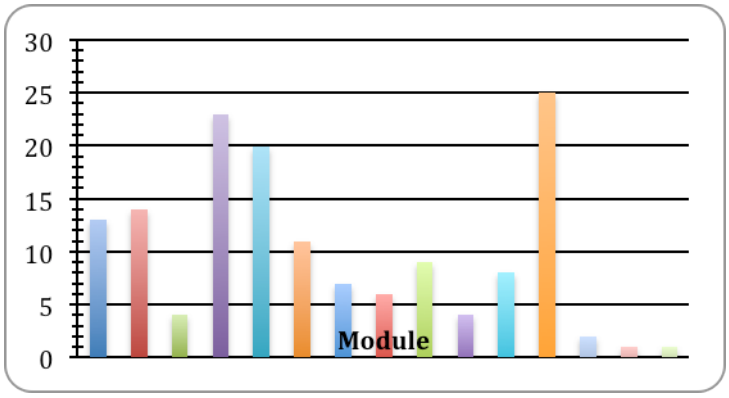

Figure 4. Student 1- Frequency of SEMEP access.

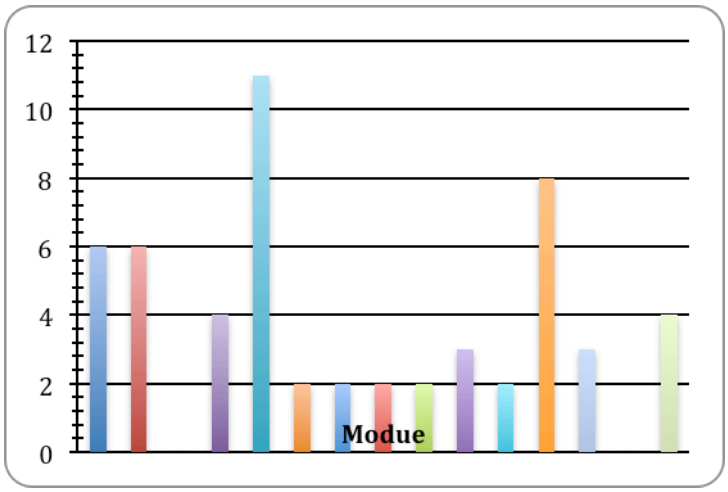

Figure 5. Student 2- Frequency of SEMEP access.

Utilisation of Other Resources

The questionnaire also asked the junior doctors what other resources other than SEMEP they used for studying and answering clinical questions

Figure 6 shows that the subjects use a variety of resources for studying, the most popular being books at 25% followed by search engines and specific websites at 18%. This shows a very traditional approach to studying, which is considered unusual, as students since 2001 have been thought of as digital natives (Prensky, 2001). The theory of digital natives suggests that students who were born after 1980 have had a high exposure to a variety of social digital technologies from a young age (Palfrey & Gasser, 2010). The effect of this exposure to technology whilst a child's brain is developing is believed to influence the way in which their brains are wired (Van Slyke, 2003) and in turn, the way they learn.

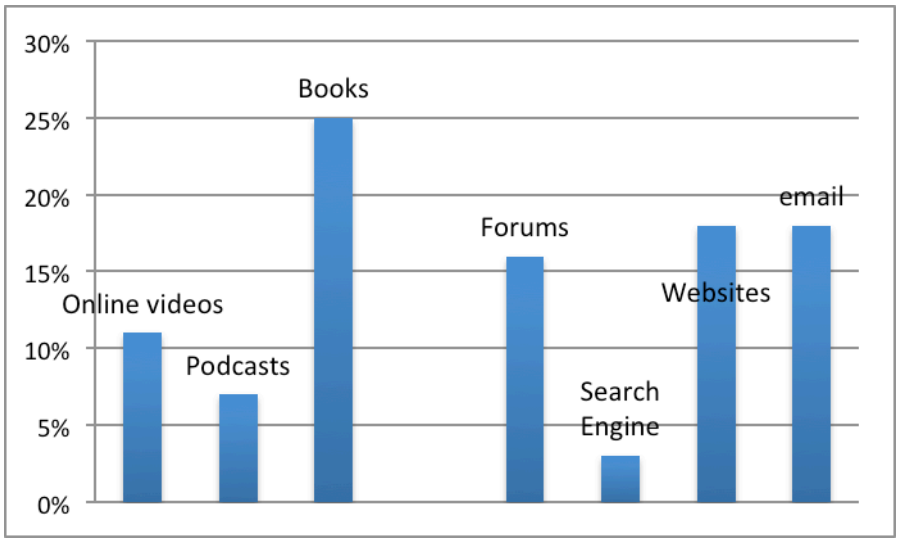

Figure 6. Resources for study.

Although the questionnaire revealed that 59% of the junior doctors stated they would prefer to ask a Senior Clinician when they have a clinical question, time constraints often lead them to look up these questions online. Figure 7 shows that the junior doctors consult a variety of resources. However, the majority use an Internet based resource, with 27% using the hospital intranet guidelines and 24% using Wikipedia. Previous studies showed Wikipedia as the top resource with the search engines and hospital guidelines second (Long, 2011). The popularity of Wikipedia may be due to the ability to access information quickly, which is necessary in a clinical situation.

These results indicate that a traditional way of learning through books and asking questions is preferred by the subjects, but when they are in a clinical situation, which has time constraints, they will use the Internet.

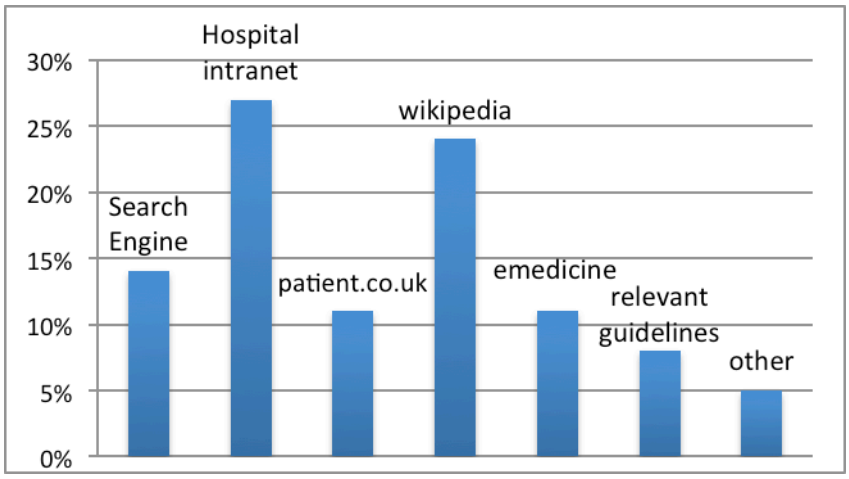

Figure 7. Online resources used for answering clinical questions.

Discussion

Virtual Learning Environments such as Moodle and Blackboard are now commonplace at Universities (JISC, 2005) and have become popular as part of training courses since 2003 (Lehtinen).

The results indicate that the two cohorts mostly used the SEMEP VLE at the beginning of their training, usually over the first two months. On average they accessed the first few modules around 2-3 times. However 63% of the junior doctors were accessing at least one module four or more times. This indicates the doctors are using strategic learning methods to study the key information they need to commit to memory.

Strategic learning methods are often used by undergraduate medical students for passing examinations (Shankar et al, 2006) and are also a recommended method of studying by a guide created for Australian junior doctors (MDA, 2010). Studies have shown medical students will use the strategic learning methods to achieve high grades, electing either a deep or surface approach depending on what they deem will be successful (Mcparland et al., 2004). The results suggest that the junior doctors in this study were using a strategic method for learning and memorising the elements of the course they were likely to come across on the ward. Due to the subjects' rotation around different wards it is likely that some of the subjects had decided they were not planning to specialise in emergency medicine. These subjects were possibly using surface learning to memorise what they were likely to come across. Others may be considering specialising in emergency medicine and were more likely to be applying deep learning techniques to memorise and understand the content available on the VLE. This is a possible reason why some junior doctors accessed the resources over 5 times and others only once. Further research will include questionnaires that ask the junior doctors if they are considering specialising in emergency medicine.

Time constraints seem to be a major factor for the junior doctors when choosing resources for studying and answering clinical questions. This has been found in previous research that has suggested resources doctors' use to

answer clinical based questions whilst in training must be immediately and easily accessible (Ismach, 2004).

The results showed that the junior doctors prefer to use books for studying when they are not on ward rounds. This traditional method of studying is unusual as there is an assumption that anyone who has studied a degree within the last ten years is a digital native (Prensky, 2001). Even the research that opposes the digital native theory admits that the majority of students are active users of technology (Jones *et al,* 2010). However there is research that suggests that the educators need to embrace the technology in order for it to become used for studying within medical education (Sanders & Schroter, 2007). This would suggest that the junior doctors are using traditional methods of studying because that is the way they have been taught to study. However when they come to answer a clinical bedside question they use their connection to technology to answer a question quickly. This implies a deep learning technique for studying and a surface technique for answering questions quickly, which suggests the idea using of strategic learning techniques.

Conclusion

This study aimed to investigate the way in which junior doctors engaged with a VLE as part of their training in emergency medicine and their learning techniques for studying and answering clinical questions.

The study demonstrated that a Moodle based VLE can be effectively used as a resource in training junior doctors in emergency medicine. The high number of subjects reviewing specific parts of the video resources also showed a significant engagement with the online videos.

The questionnaire revealed that the junior doctors use traditional studying techniques with a majority of their information coming from books. In contrast, to answer clinical questions whilst on a ward the junior doctors would use Internet resources due to time constraints. This would imply that they evaluate the situation by how much time they have before deciding what resource to use and then determine whether to use deep or surface learning techniques. This is generally regarded as strategic learning.

The SEMEP video lectures overcame the time constraints previous cohorts had with attending traditional lectures and this also allowed the junior doctors to review certain parts of the lectures. However similar studies have found that simply incorporating video into e-learning isn't always sufficient to improve learning (Zhang *et al,* 2006). Further research would need to be completed to establish exactly what learning strategies the junior doctors use and if these are successful at helping them pass examinations and providing high quality patient care.

This study has shown that there is a definite place for virtual learning environments within training junior doctors in emergency medicine. However further work needs to be completed to understand the differences in learning strategies the junior doctors apply to a variety of situations. In turn this will

influence the design of the VLE in order to make it efficient and to encourage the subjects to gain an understanding of the topics covered rather than just memorising facts.

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