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E-Learning in medical education in the United Kingdom

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Abstract

Background

Electronic-learning describes the use of information technology or the internet for learning activities. Integrating e-learning into medical education is supported by adult learning theory; learners control content, sequence, pace, time and media, fitting different learning styles. Courses are standardized in terms of content and delivery and can include assessment and feedback.

Implications

Technology is a tool for deeper learning, and learning experiences beyond lecture-based learning. With the emergence of students who have grown up with technology, e-learning may increase. In an era of value for money, e-learning offers an opportunity to disseminate the experience of clinicians to a wide audience.

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1.1. Background

Electronic-learning, or e-learning, describes the use of information technology or the internet for learning activities. The integration of e-learning into undergraduate, graduate, and continuing medical education is consistent with adult learning theory and presents a revolution in medical education. Technology is a powerful tool for effective teaching and deeper learning. Incorporating technology into teaching and learning activities introduces new thinking about teaching effectively. It also increases opportunities to invent new learning experiences for students that will take us further beyond traditional classroom or lecture-based learning. With UK hospitals becoming concentrated on a smaller number of sites, the need for distance learning and community based learning has increased.

The shift toward competency-based curricula, the complexity and breadth of medical education content, changes in health care delivery and advances in medicine have all increased demands on doctors to update their knowledge constantly. These factors require adaptations in education and e-learning is a proposed solution. Furthermore, with students enrolling in education in other countries with increasing frequency, e-learning offers opportunities to access

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written information and easily listen to information more than once. Dhaliwal (2009) notes what a challenge it is to teach English in Japan, reflecting on what a challenge it is to speak at a slow enough speed.

E-learning is also called web-based learning, online learning, distributed learning, computer-assisted instruction, or internet-based learning. Historically, there have been two common e-learning modes: distance learning and computer-assisted instruction with the internet as the integrating technology in these two modes, Ruiz (2006). Distance learning uses information technologies to deliver instruction to learners at remote locations from. Computer-assisted instruction (also called computer-based learning and computer-based training) uses computers to aid in the delivery of learning and teaching.

The idea that a new generation of students is evolving has caused discussion among educators and commentators. Termed ‘digital natives’, “generation Y”, or the ‘net generation’, these young people are said to have been immersed in technology all their lives, imbuing them with sophisticated technical skills and learning preferences for which traditional education is unprepared. It is claimed that their use of information and communication technology (ICT) differentiates them from previous generations of students and from their teachers, and that the differences are so significant that the nature of education itself must fundamentally change to accommodate the skills and interests of these ‘digital natives’. They are held to be active experiential learners, proficient in multitasking, and dependent on communications technologies for accessing information and for interacting with others, Prensky (2001).

Tapscott (1998) described education in developed countries as already in crisis: ‘*There is growing appreciation that the old approach [of didactic teaching] is ill-suited to the intellectual, social, motivational, and emotional needs of the new generation*’. This was echoed by Prensky (2001) who claimed that: ‘*Our students have changed radically. Today’s students are no longer the people our educational system was designed to teach*’. Bannett (2008) argued that such calls for major change in education have been subjected to little critical scrutiny, are under-theorised, lacking a sound empirical basis. Suggesting that the picture beginning to emerge from research is that young people’s relationship with technology is complex. Finally, Sandars and Schroter (2007) undertook an online survey which suggested that although medical students had a high awareness of modern technology, they identified a training need. Thus we see that students have grown up in a different technological and educational era, but that there is a need to fully understand the digital media they may be offered or access.

Creating e-learning material involves several components: once content is developed, it must be managed, delivered, and standardized. Content comprises all instructional material structured in a meaningful way. Material could be linked to specific learning objectives as a part of a specified curriculum. Examples of the instructional materials include tutorials, PPT of lectures, case-based learning, hypermedia, and web links. Content management includes all the administrative functions (e.g. storing, indexing, and cataloging) needed to make e-learning content available to learners. Examples include portals, repositories, digital libraries, learning-management systems, search engines, and e-Portfolios. A learning-management system, for example, is Internet-based software that facilitates the delivery and tracking of e-learning across an institution (Ruiz, 2006).

Content delivery may be either synchronous or asynchronous. Synchronous delivery refers to real-time, instructor-led e-learning, where all learners receive information simultaneously and communicate directly with other learners. Examples include teleconferencing (audio, video, or both), Internet chat forums, and instant messaging. With asynchronous delivery, the transmission and receipt of information do not occur simultaneously. The learners are responsible for pacing their own self-instruction and learning (Wentling, 2000). It is important to set standards for e-learning materials to ensure that it is compatible with the learning objectives for medical education, easily accessible and usable across many computer systems.

A key advantage of e-learning is that learners have control over the content, learning sequence, pace of learning, time and, often, media offering choices to suit different learning styles. E-learning improves accessibility to quality educational materials through the availability of the significant number of e-learning resources created over the years. It also develops on line and IT skills. E-learning technologies make the revising and updating of the electronic educational materials simpler and quicker than printed materials. E-learning resources such as courses are

standardized in terms of content and delivery and can be designed to include outcomes assessment (either formative or summative), which enables instant feedback to determine whether learning has occurred.

Some authors believe that students learn more and quicker when computers are used, and many of the “generation Y” students prefer computer-aided learning packages compared to just using a textbook. This is especially so if there is an interactive component to it (McKendree, 2010). Of course the package has to be designed well in to be effective. It is not enough for the content to be sound, if the way it is delivered is lacking. Similarly, a lecture given to students may contain all the information on the slides, but if it is not delivered well by the lecturer, then the effectiveness is curtailed. Furthermore, there is a developing body of literature describing the moral development of medical students. The Agora package described van der Burg and van de Poel (2005) details an online package encouraging medical students to reflect on ethical dilemmas. Finally, problem based learning, in which students collectively tackle learning projects, usually with the supervision of a clinical tutor, is a key part of medical teaching in the UK.

Different aspects of e-learning have been explored in studies comparing e-learning with traditional instructor-led approaches; including utility, efficiency, cost-effectiveness, and crucially learner satisfaction. Utility refers to the usefulness of the method of e-learning. Several studies outside health care have revealed that often e-learning is at least as good, if not better than, traditional instructor-led methods such as lectures in contributing to demonstrated learning (Wentling, 2000). Evidence suggests that e-learning is more efficient because learners gain knowledge, skills, and attitudes faster than through traditional methods. This efficiency is likely to translate into improved motivation and performance. E-learners demonstrate increased retention rates and better utilization of content, resulting in better achievement of knowledge, skills, and attitudes (Clark, 2002).

A substantial body of nonmedical evidence has shown, on the basis of sophisticated cost analysis, that e-learning can result in significant cost-savings, compared with traditional instructor-led learning (Gibbons, 2000). Savings are related to reduced instructor training time, travel costs, labor costs, reduced institutional infrastructure, and the chance to expand programs with new educational technologies (Gibbons 2000). Only one study was found in the medical literature that compared the cost-effectiveness of e-learning with text-based learning. The printing and distribution of educational materials was found to be less costly than creating and disseminating e-learning content (Chumley-Jones, 2002).

Studies in both medical and nonmedical literature have consistently demonstrated that students are very satisfied with e-learning (Gibbons, 2000; Chumley-Jones, 2002). Satisfaction rates increase with e-learning compared to traditional learning, along with perceived ease of use and access, navigation, interactivity, and user-friendly interface design. Students do not see e-learning as replacing traditional instructor-led training but complementing it, forming a blended-learning strategy (Gibbons, 2000; Chumley-Jones, 2002). The potential for collaborative learning to break the isolation of learners is realised in e-learning technologies. Advances in synchronous distance education and collaborative technologies like Weblogs, message boards, chats, e-mail, and teleconferencing are making collaborative learning more readily available. Quantitative and qualitative studies of collaborative learning in medicine have shown higher levels of learner satisfaction, improvements in knowledge, self-awareness, understanding of concepts, achievement of course objectives, and changes in practice (Wiecha, 2002).

Developing infrastructure to support e-learning within medical education requires large investments in terms of money, time, web/internet space, skills and administrators. It also requires a robust process to evaluate and monitor the quality of the content of the educational material in the electronic resources e.g. methods for peer review of these resources. And evaluation of its utility; for example, is it easy to navigate through the online material? Are special computer skills, hardware, or software required?

Students and doctors have different learning styles and preferences about the way they are taught. Some students may find it harder to learn by e-learning and prefer the traditional teacher-based teaching e.g. lectures and tutorials. Similarly, problem based learning, which still depends on student self education, is no more educationally effective than the traditional approach, but it is not enjoyable for some students. E-learning requires the students to have

adequate level of IT skills and access to Personal Computers. There may be issues related to copyright and accessibility to some electronic resources. Plagiarism is also a potential issue, with many students posting their work or theses online. However, there are software packages to counteract this, such as the “Turnitin” software (Turnitin.com) that several academic establishments now use, which automatically checks several databases in the medical literature for any repetition of sentences or phrases. Of course there is a large possibility of error by chance or co-incidence and it therefore requires checking by someone else.

E-learning could be useful in building up knowledge, e.g. basic sciences, from the available resources. However, its value is limited in teaching medical students and qualified doctors’ clinical skills e.g. physical examination and surgical techniques, which require direct observation and practice. Also, it will have a limited value in teaching communication skills which is best learned by interaction with patients and colleagues in clinical practice. Additionally, although many students can access a plethora of websites to gain information, it can be difficult to have quality assurances of some of them. Authors have already expressed some concern in this area. Blogs and wikis (such as Wikipedia) come with no guarantees over their educational or factual content. Gin (2010) writes: “Blogs, as they are often written by individuals, are vulnerable to being superficial, to the expression of personal views masquerading as fact and to the echoing of pre-existing data or opinion. Wikis, due to their collaborative nature, are less prone to polarisation, but are particularly vulnerable to vandalism and misinformation – either malicious or due to commercial influence.” Perhaps there is some scope for tutors vetting the websites or other on line resources and then recommending trusted ones to students? Furthermore, students may be more likely to access free resources while many high quality journals may charge for access.

With e-learning, students become their own teachers with little need for formal teaching and teachers are simply content providers for instructional designers. Technology is a tool which if incorporated efficiently into teaching produces useful outcomes. It should complement but not replace the traditional medical teaching. The role of good teachers is crucial in the learning process and should not be undermined. Good teachers shorten the learning process by providing relevant information as well as assessment, guidance, and examples. They lead and motivate the students, create live interactions, use their experience and skills to teach and flourish the learning process- all highly regarded features of a positive learning environment. In addition, self-teaching could be inefficient if not directed properly e.g. students may miss out on important information or educational materials.

1.2 Conclusion

The integration of e-learning into existing medical curricula should be the result of a well-devised plan that begins with a needs assessment and concludes with the decision to use e-learning, Kern (1998). In undergraduate medical education, e-learning should complement the traditional teacher-led activities, forming part of a blended-learning educational strategy. In post graduate medical education e-learning can provide valuable resources for updating knowledge and contribute to Continuous Professional Development for doctors.

E-learning resources within medical education facilitate the learning process for medical professionals especially in the current era where there is a great emphasis on lifelong learning and competency-based education. Areas for research include assessing contexts for effective use of e-learning in medical education, the differential use of e-learning in preclinical versus clinical years, the adaptation of e-learning to a wide variety of medical specialties and clinical settings, and the incorporation of e-learning as part of a blended-learning strategy.

With the recent emergence of e-readers such as the iPad, and smart phones with their “apps”, e-learning is likely to continue to play a large role in education. The free downloadable Student British Medical Journal iPhone app provides news, research, education, blogs and podcasts. Additionally the educational podcasts provided by the royal colleges, e.g. the Royal College of Psychiatry, provide a key source of continuing professional development accessible at any time.

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