"Wherever, whenever" learning in Medicine: Interactive mobile case-based project

Karen M. Scott[1], Sharon Kitching[2], Daniel Burn[3], Marianna Koulias[2], Dianne Campbell[1] & Megan Phelps[1]

[1]Discipline of Paediatrics & Child Health, The University of Sydney; [2]Sydney eLearning, The University of Sydney; [3]Sydney Medical School, The University of Sydney

Case-based learning scenarios are a proven, effective learning tool. Mobile devices can be used for the scenarios to enhance medical student learning when needed, at the patient bedside. Initial evaluation demonstrated students were positive about the mobile case-based learning scenarios and particularly favoured the flexibility and freedom afforded.

Keywords: mobile learning, case-based elearning scenarios

Background

Mobile learning, made possible by small web-enabled (3G) PDA type devices, has the potential to enhance learning through real-time connection to the Internet. Mobile learning is generating interest within higher education due to its key benefit: the portability of the mobile devices and the possibility of enabling student learning through internet facilitated access to structured learning environments while students are away from their computers (Kukulska-Hulme 2005). For medical and health sciences students, mobile devices have the potential to be hand–held mini–computers for accessing resources such as electronic texts and drug dosage information at the bedside (Masters & Ellaway 2008). These devices will conceivably become part of patient information eHealth systems and will soon be trialled by the Victorian Government in hospitals. As expressed recently, "mobile learning and associated activities such as podcasting will become the mainstream, the remaining issues being in respect of applicability and efficacy. The opportunities will continue to grow, and institutions that are not already investigating or using mobile learning will face increasing problems and challenges from their learners" (Ellaway & Masters 2008 p488).

Despite the increasing interest in mobile elearning in higher education, the 2006 ALTC project 'New technologies, new pedagogies: Using mobile technologies to develop new ways of teaching and learning' found an "absence of cohesive, national policy on mobile learning" (Herrington et al. 2008, p4). Indeed, much of the educational content for mobile elearning is in the form of podcasts that are passive in nature, largely involving lectures (Sutton-Brady *et al.* 2009). However, there is an emerging literature on mobile learning, such as an ALT-J special issue (Kukulska-Hulme & Sharples 2009) and Thomas Cochrane's research in the Arts at Unitec (Cochrane & Bateman 2010). Little research has been published on mobile learning in the medical and health sciences, especially as it relates to case-based or bedside learning. An exception is Palmer & Devitt (2007), who developed interactive case studies for the iPod for medical

students at the University of Adelaide. While useful, the researchers foresaw the potential of the iPhone for improving the educational impact of interactive case studies.

Introduction

In recent years there has been a large amount of interest in the development of interactive case-based learning scenarios in the medical and health sciences. This interest has increased with the potential use of mobile devices. Case-based learning has been shown to be an effective learning tool in clinical medicine, and is widely used throughout many medical and health curricula (Mostaghimi et al. 2006). Academic staff from the Discipline of Paediatrics and Child Health, Sydney Medical School, were interested in assessing how case-based elearning scenarios on mobile devices could engage students in their learning and assist with bedside learning in hospitals. In 2009 and 2010 we developed three case scenarios for mobile devices, working with IT development staff at Sydney Medical School and the University's web development support unit, Sydney eLearning. The associated poster outlines development of the case scenarios, screen shots and student evaluation over the two phases of the project in 2009 and 2010.

The project

The 2009 phase one case scenario mirrored medical students' problem-based learning tutorials. It contained the presentation of an adolescent patient with anorexia nervosa, made from a slide-show with accompanying audio file, and an unfolding case description. It also contained interactive true/false and checkbox-style questions with automatic feedback, designed to engage the students in the associated reading material, lectures, references and weblinks. Initial plans to use the specifications outlined by Palmer & Devitt (2007) for the iPod were abandoned due to lack of transference to the iPod touch. The case was subsequently developed using HTML, with Hot Potatoes freeware for the questions.

A trial of the pilot scenario was held with fourteen medical students in October-November 2009, with approval from The University of Sydney Higher Education Research Committee. The students were positive about the potential use of the iPod touch for elearning and made useful recommendations for improving the case scenario and developing elearning materials on mobile devices. The eight students who participated in a follow-up evaluative survey and focus group favoured the mobility of the elearning device. Students reported that they liked, "just having it all at your fingertips - portable," and the "freedom to do [self-directed study] whenever and wherever."

The project team were keen to address student feedback when developing the phase two case scenarios in 2010. Consequently, student requests for more structured narrative flow and integrated questions, along with an improved graphical user interface where incorporated into the 2nd and 3rd cases. A resume function, which allowed them to 'bookmark' their place in the case study, accumulative scoring of questions and a cleaner interface were incorporated into the new design. The content was written to mirror an authentic clinical reasoning process and questions were all multiple choice. A pre-case quiz was developed to engage students in the topic and more references to online publications were incorporated. The case was developed using CSSS3 and HTML5. Designed as web pages, they utilised the HTML5 capabilities of the Safari mobile browser to allow students to 'store' the web pages in their device for later use, or in an off-line situation, such as at the patient bedside or whilst on public transport. The multiple choice questions where built in Javascript, and scores and repeated attempts are recorded. The pilot case was redeveloped in the new style. Downloading of the case scenarios was significantly improved to facilitate access by students with their own devices. Medical students will use the case scenarios throughout semester 2 2010 and their evaluations will be incorporated into the associated poster.

Conclusion

Mobile learning has the potential to improve medical education and interact with patient information systems. Initial student evaluation of case-based learning scenarios on mobile devices has demonstrated its potential to enhance bedside learning. Students were positive about the possibility of learning on mobile

devices and in particular favoured the flexibility and freedom it afforded. Further research is recommended to ascertain other ways in which mobile learning can enhance learning in medicine.

Acknowledgements

References

Cochrane, T. & Bateman, R. (2010) Smartphones give you wings: Pedagogical affordances of mobile 2.0. Australasian Journal of Educational Technology, 26(1), 1-14.

Herrington, J., Herrington, T., Ferry, B. & Olney, I. (2008). *New technologies, new pedagogies: Using mobile technologies to develop new ways of teaching and learning.* http://www.altc.edu.au/resource-new-technologies-new-pedagogies-uow-2009

Kukulska-Hulme, A. (2005). Introduction. In *Mobile learning: A handbook for educators and trainers*, ed. A. Kukulska-Hulme & J. Traxler, 1-3. London: Routledge.

Kukulska-Hulme, A. & Sharples, M. (2009). Special issue on mobile and contextual learning. *ALT-J, Research in Learning Technology,* Vol. 17, No. 3, November 2009, 219-232.

Masters, K. & Ellaway, R. (2008). eLearning in medical education Guide 32 Part 2: Technology, management and design. Medical Teacher, 30 pp.474-489.

Mostaghimi, A., Levison, J.H., Leffert, R., Ham, W., Nathoo, A., Halamka, J., Prout, C., Arky, R.A., Tosteson, D.C. & Quattrochi, J. (2006). The doctor's new black bag: Instructional technology and the tools of the 21st centry physician. *Medical Education Online*, 11.

Palmer, E.J. & Devitt, P.G. (2007). A method for creating interactive content for the iPod, and its potential use as a learning tool: Technical advances. *BMC Medical Education,* 7(32).

Sutton-Brady, C., Scott, K.M., Taylor, L., Carabetta, G. & Clark, S. (2009). The value of using short-format podcasts to enhance learning and teaching. ALT-J, Research in Learning Technology, Vol. 17, No. 3, November 2009, 219-232.

Author contact details:
Karen M. Scott, Discipline of Paediatrics & Child Health, Sydney Medical School, The University of Sydney.
Email: karens12@chw.edu.au