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Evidence is Good for Your Practice using Technology: Enhancing engagement of healthcare professionals in online education

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Introduction

It is axiomatic that healthcare should be based on the best available evidence. Consumers of healthcare have a right to expect that they are being treated or cared for in the most appropriate manner available for their condition. This requires that providers of healthcare services be able to apply research and other evidence in their daily practice. This paper outlines approaches used to helping student doctors, nurses and allied health professionals fully engage with evidence-based practice modules delivered via e- learning. This mode of delivery presents learning materials; such as readings, discussions, lectures, tutorials, tasks and assessments; online, using sophisticated software set-up to provide a virtual learning environment (VLE). E-learning is on the rise as it can be more efficient and effective than more traditional forms of education; such as face-to-face lectures and tutorials. E-learning is particularly well-suited to part-time education which is often favoured by busy healthcare professionals, who are the target audience for advanced education to support evidence-based practice.

Background

Basing medical decisions upon rigorous evidence grew from the pioneering work of Archie Cochrane (1909-1988) who initiated the collection and organization of available research evidence on specific topics. Cochrane favoured the evidence drawn from clinical trials, noting the strongest evidence arose from randomised clinical trials. This laid the foundations of modern evidence-based medicine which aims to provide care that is informed by rigorous up-to-date research-based findings, rather than subjective opinion (Hill, 2000).

It has long been established that nurses and other healthcare professionals often have difficulty in retrieving and interpreting research evidence. Parahoo (2000), for example highlighted the inability of nurses to understand research papers as a major barrier to the development of evidence based practice in nursing.

In recent years Internet technology has brought evidence into Doctors' offices and even to the bedside through the pioneering efforts of David Sackett, founder of the Oxford Centre for Evidence-Based Medicine and author of the classic textbook *Evidence-based Medicine* (1996).

These developments have been paralleled by a broad movement within academia to deliver learning of many subjects and at many levels using Internet-mediated e-learning through a variety of VLE systems, such as Blackboard™ and WebCT™.

The development of e-learning in healthcare courses is charted by Riuz et al (2006), who recognise the variability of availability and quality of the courses available (Moberg & Whitcomb, 1999; Ward et al, 2001). Chumley- Jones et al (2002) identified four domains to be considered when designing e-learning courses: *knowledge gain, learner attitudes, learning efficiency* and *programme costs*. In line with the development of technologies for delivering e-learning a number of published papers have examined these domains.

A number of recent systematic reviews and meta- analysis have explored the effectiveness of electronic delivery for knowledge gain (Chumley- Jones et al, 2002; Cook et al 2010). They report that despite using a variety of evaluation techniques there appears to be no significant differences in the knowledge gained by students when course material is delivered via the internet, suggesting that web based learning can achieve similar learning outcomes to traditional face-to-face delivered material.

Bell et al (2000), for example, compared the knowledge retention of 162 medical residents in the United States in a cardiology-based module when students were given material in print format or the content delivered via the internet. They report no significant

difference in knowledge retention either immediately following the intervention or six months later.

Carbanaro et al (2008) report similar findings in a blended learning course on team process skills in the development of a multi-disciplinary team of nurses, medics, pharmacists, occupational therapists, dentists, dental hygienists, medical scientists and nutritionists.

Spice et al (2011) recently introduced an online research design course for palliative care medical residents. They report an increase in knowledge and satisfaction with the course, however the small sample size (n=10) precludes any meaningful conclusions to be drawn. Similarly Clark et al (2011) report an enjoyable and useful learning experience amongst Japanese dental care specialists undertaking an online research methods module. However, they do not appear to report any knowledge gains and, again the small sample size (n=13) hinders generalisation.

While the previously mentioned studies aimed to develop knowledge in doing research, evidence on e-Learning for *using* research is also equivocal. A large team (Hadley et al, 2010) examined e-Learning for evidence based practice, again finding no difference in learning outcomes between e-Learning and traditional face-to-face methods.

At the University of Ulster we have used proprietary VLE systems such as TopClass™, WebCT™ and lately Blackboard™ to deliver learning to student Doctors, nurses, allied health professionals. Yet, although we have successfully taught online evidence-based practice modules to over 200 students, we have begun to detect a weakness in the approach. In particular a lack of learner engagement has been noted. Recent course evaluations have highlighted student reports that they could find the e-learning environment to be challenging and even isolating. Typically, students of evidence-based practice are concurrently working as healthcare practitioners, often with heavy workloads, which put additional stress on them as learners and a strain on the learning environment. Nevertheless, these modules are highly practice-oriented and clearly relevant and useful to students' professional practice.

This paper provides a report of an initial stage of development of one of an ongoing series of educational technology projects to address student concerns, promote engagement and build communities of learners on these modules of study having learning outcomes to develop and enhance evidence-based practice. In order to achieve a productive synergy we sought assistance from educational technologists to help bring e-learning into the students' professional life in a more integrated manner by the use of technology with the aim of improving student engagement and learning efficiency.

Methods

Three online devices were proposed to enhance the existing online learning module in Evidence Based practice with the aim of developing more engaged learners and enhancing the sense of the online environment as a supportive learning community. These were text messaging, Confluence WIKI and Reusable Learning Objects (RLOs). Each has been subject to prototyping and initial testing within the School of Nursing.

Text messages

The high penetration of mobile telephony into the lives of students has not gone unnoticed. Using mobile 'phones for semi-formal communication can address the issue of maintaining learners' attention - a critically important consideration in the design and development of virtual environments for learning, as these environments depend upon learner attention as an essential condition of their functioning (de Castel & Jenson, 2004). Additionally text messaging allows for the students to access brief information about their academic classes while not logged on to a computer (an important consideration for busy healthcare professionals). Text messaging was initially proposed as a simple device to alert students to key learning and assessment opportunities - it is planned that in future this will be further utilised as a means of communicating questions and answers to inform evidence-based practice (Figure 1).
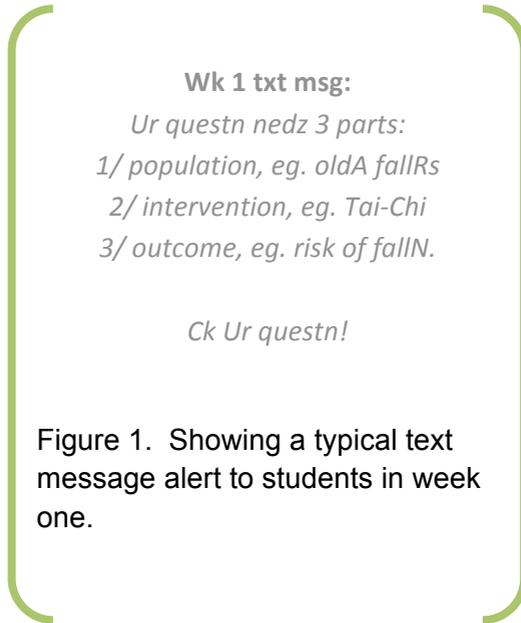
Wk 1 txt msg:
Ur questn nedz 3 parts:
1/ population, eg. oldA fallRs
2/ intervention, eg. Tai-Chi
3/ outcome, eg. risk of fallN.

Ck Ur questn!

Figure 1. Showing a typical text message alert to students in week one.

Embedded WIKI

The first wiki was created in 1995 by Ward Cunningham. The name "Wiki" was inspired by the Hawaiian word *wiki* or *wiki-wiki*, which means "*quick*". A Wiki may be defined as a combination of a Web site and a Word document which allows site visitors themselves to easily add, remove and otherwise edit and change available online content. Wikis encourage group social interaction and collaboration. They support asynchronous communication allowing users to contribute content at a time, and from a place that suits them. This highly interactive process is intended to stimulate lively discussion and promote collegiality (Figure 2). Wikis are also valued for their capacity to encourage students to become actively involved in the construction of knowledge (Department of Education, Government of Western Australia, 2010). At the University of Ulster we use the Confluence WIKI embedded within the Institutional VLE. It is proposed that the learning outcomes can be established using five WIKIs to capture the five components of evidence-based practice. These are: question formulation; evidence search; critical appraisal; implementation and audit. There is a helpful match between this incremental, stepwise approach to evidence-based practice and the

idea of a WIKI as a unit of knowledge, demonstrated for the whole class to see.

Wiki entry:
Cat and Dog bites: in primary care ..limiting my search to English language publications over the last 5 years I got 15,400 results which included an RCT which looked promising.
Using a data base search was more rewarding, review articles, original research and RCT was obtained.
..Medline gave me 22 results for cat and dog bites- 4 were helpful which included an RCT.
Using the words primary care *was best avoided as I got a lot of irrelevant material that way!*

Response:
I think the intervention is clear (an antibiotic vs none), and the population are people who have sustained an animal (cat/dog) bite. Yes, outcome would be infection rate...

Figure 2. A student-led wiki describing stage two of the learning journey: searching for evidence. A short supportive response is included, from a peer.

Reusable Learning Objects

Reusable learning objects (RLOs) are defined as "web-based interactive chunks of e-learning designed to explain a stand-alone learning objective. The fact that the learning object has been broken down to a low level of granularity facilitates its re-use in different learning and teaching situations" (Higher Education Academy, 2010). RLOs on a wide variety of academic subjects can be retrieved from a repository by an academic working at a standard desktop PC and utilized for his or her own teaching practice. Useful resources include JORUM (2010), a free online repository service for teaching and support staff, which aims to build a community for the sharing, reuse and repurposing of learning and teaching materials (http://www.jorum.ac.uk/) and the University of Nottingham School of

Nursing and Educational Technology group (SONET) which provides RLOs specifically relevant to nursing and healthcare professionals. (Figure 3). At a fundamental level RLOs can provide alternative and supportive learning strategies and may even take the place of existing materials. Material to support many common topics is readily available. The example is useful to reinforce the module definitions, so that the student achieves a better understanding of the basic concepts involved.

Reusable Learning Object

Aims and Objectives
To understand the concept of evidence based practice
To understand how, in outline, how evidence based practice is done

Target Audience
All students studying evidence based practice
How to use this Resource
It should take about 5-10 minutes to complete

Figure 3. A useful RLO from
http://sonet.nottingham.ac.uk/rlos/

Outcomes
An early prototype of the new enhanced module, including a text-message facility, an embedded Confluence WIKI and RLOs has been developed and will be delivered to forthcoming classes in evidence-based practice in the School of Nursing. As well as developing and enhancing the development of an online learning community, it is intended that the mobile aspect of this approach will help to more fully embed the learning experience in the student's day-to-day life-world and assist in the development of background,

transferrable skills in computer literacy and networking with peers. This will result in even closer linkage between academic learning and the professional environment of busy healthcare professionals. Development of this process will also provide a valuable learning and development experience for the academic staff involved. A planned evaluation of the project using an Action Research approach (identification, data collection & interpretation, action, reflection) will provide valuable feedback and an evidence base on its potential for further use across a range of other web-based modules in the University.

While Hadley et al (2010) examined e-Learning for evidence based practice and found no difference in learning outcomes between e-Learning and traditional face-to-face methods, this study only examined learning outcomes in terms of knowledge gains and potential cost effectiveness. Other important domains such as learner attitudes and learning efficiency (Chumley- Jones et al, 2002) were not explored and reports from our own students highlight the importance of these aspects, particularly for students working in health-care professions alongside their academic studies. Text-messaging (DuVall et al, 2007), the use of WIKIs (Lamb, 2004) and RLOs (Gehringer et al, 2007) have been shown to improve levels of student engagement and the development of active learning strategies. By adopting these strategies for enhanced delivery of online evidence-based practice education we can improve student experiences and increase learning efficiency by building 'electronic bridges' between academic learning and the everyday environment of healthcare professionals. This enhancement is achieved through use of messages sent to mobile phones; and through building knowledge in WIKIs. Maximum efficiency can be achieved through the appropriate use and reuse of RLOs. These devices have good potential for enhanced-delivery of e-learning for evidence-based practice. We conclude that it is important for education providers to understand the current role, and increasing potential, of e-learning in the provision of education to a professional audience. For us, the recent tools and facilities, described in this paper, have the potential to extend the learning outcomes more readily into clinical practice, engage the learner more fully and assist the lecturer/course-builder through sharing and delivering best practice.

Further development is needed as part of regular course review and revalidation of professional courses which is underway and we hope to have results from wider implementation of engagement initiatives and community-building devices in the future.

References

Bell, D.S., Fonarow, G.C., Hays, R.D. and Mangione, C.M. (2000) Self-study from web-based and printed guideline materials: a randomized, controlled trial among resident physicians, *Annals of Internal Medicine,* 132 (12), 938-946.

Carbonaro, M., King, S., Taylor, E., Satzinger, F., Snart, F. and Drummond, J. (2008) Integration of e-learning technologies in an interprofessional health science course, *Medical teacher,* 30 (1), 25-33.

Chumley-Jones, H.S., Dobbie, A. and Alford, C.L. (2002) Web-based learning: sound educational method or hype? A review of the evaluation literature. *Academic Medicine: journal of the Association of American Medical Colleges,* 77 (10 Suppl), 86-93.

Clark, G.T., Mulligan, R. & Baba, K. (2011) Developing and providing an online (web-based) clinical research design course in Japan: lessons learned, *Journal of prosthodontic research,* 55 (2),61-68.

Cook, D.A., Levinson, A.J., Garside, S., Dupras, D.M., Erwin, P.J. and Montori, V.M. (2010) Instructional design variations in internet-based learning for health professions education: a systematic review and meta-analysis, *Academic medicine: journal of the Association of American Medical Colleges,* 85 (5), 909-922.

de Castell, S. and Jenson, J. (2004) Paying attention to attention: new economies for learning, *Educational Theory,* 54 (4), 381- 384.

Department of Education, Government of Western Australia (2010) *Wikis in the classroom* http://www.det.wa.edu.au/education/cmis/eval/curriculum/ict/wikis/ (accessed 21 March, 2011).

DuVall, J. B., Powell, M. R., Hodge, E., and Ellis, M. (2007) Text messaging to improve social presence in online learning, *Educause Quarterly, 3*, 24-28.

Gehringer, E., Ehresman, L., Conger, S. G., & Wagle, P. (2007) Reusable learning objects through peer review: the Expertiza approach, *Innovate* 3 (5), http://www.innovateonline.info/index.php?view=article&id=365 (accessed April 16, 2011).

Hadley, J., Kulier, R., Zamora, J., Coppus, S. F. P. J., Weinbrenner, S., and Meyerrose, B. (2010) Effectiveness of an e-learning course in evidence-based medicine for foundation (internship) training, *Journal of the Royal Society of Medicine*, July PMC2895523 (7), 288-294.

Higher Education Academy (2010) *Reusable Learning Objects* http://www.ics.heacademy.ac.uk/resources/rlos/index.php (accessed 21 March, 2011).

Hill, G.B. (2000) Archie Cochrane and his legacy: an internal challenge to physicians' autonomy? *Journal of Clinical Epidemiology,* 12 (4) 1189-1192.

Jorum (2010) *Learning to share* http://www.jorum.ac.uk/ (accessed 21 March, 2011).

Lamb**,** B**.** (2004) Wide open spaces: Wikis, ready or not**,** *Educause Review***,** 39 **(**5), 36-48.

Moberg, T.F. and Whitcomb, M.E. (1999) Educational technology to facilitate medical students' learning: background paper 2 of the medical school objectives project, *Academic medicine: journal of the Association of American Medical Colleges,* 74 (10), 1146-1150.

Parahoo, K. (2000) Barriers to, and facilitators of, research utilization among nurses in Northern Ireland, *Journal of Advanced Nursing,* 31(1), 89-98.

Ruiz, J.G., Mintzer, M.J. and Leipzig, R.M. (2006) The impact of E-learning in medical education. *Academic medicine: journal of the Association of American Medical Colleges,* 81(3), 207-212.

Sackett D. (1996) *Evidence Based Medicine*. Oxford: Churchill Livingstone.

Spice, R., Palacios, M., Biondo, P.D. and Hagen, N.A. (2011) Design and implementation of an online course on research methods in palliative care: lessons learned, *Journal of palliative medicine*, 14 (4), 413- 419.

University of Nottingham School of Nursing and Educational Technology group (SONET) *Reusable Learning Objects* (http://sonet.nottingham.ac.uk/rlos/) (accessed 21 March, 2011).

Ward, J.P., Gordon, J., Field, M.J. and Lehmann, H.P. (2001) Communication and information technology in medical education, *Lancet,* 357 (9258), 792-796.

George, Wendy and Iain lecture in the School of Nursing in clinical application of research, often described as evidence-based practice. Between them, they have 20 years' experience in that role at all levels. Ursula is an e-Learning consultant who has supported and advised the nursing team over the past 18 months. Damian is a postgraduate student who took one of the courses and provided critical user-appraisal of the project. He is now working as a Health Promotion Officer in the west of Scotland.