Final Assignment # 2

Research Proposal

Leveraging mobile technologies for delivering PBL Tutorials in MD Undergraduate Curriculum

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ETEC 500 – Section 65D

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2011

Introduction

The objective my research is to test the effectiveness of mobile learning for delivering Problem Based Learning (PBL) tutorials within the MD undergraduate curriculum (MDUG). A significant body of research supports the immense value of PBL in medical teaching and learning as a rational, sequential process of inquiry that leads to discussions and fosters collaboration and communication among students. Studies published by Association of American Medical Colleges have shown that PBL based medical curriculum significantly reduces lecture time and favours medical science teaching in the context of clinical cases as opposed to rote memorization. The power of PBL is evident from the fact that vast majority of North American medical schools including University of British Columbia (UBC), Canada have it integrated within the first two years of MDUG.

In my role as a Technical Solutions Analyst within the Technology Enabled Learning division at UBC Faculty of Medicine, I continually research latest educational technologies and find innovative ways of leveraging them to meet the increasing demands of faculty, clinicians and students. In the MDUG curriculum at UBC, a PBL tutorial/case typically starts with patient introduction, problem definition leading to generation, testing or refinement of a hypothesis by progressively elaborating and unfolding the underlying science mechanisms. In this self-directed weekly study, students try to solve clinical problems by researching and analyzing the existing body of knowledge and collaborating among their group members and tutors for appropriate guidance. At the end of the week, students engage in case reflection and review the learning objectives.

Currently, PBL cases are conducted primarily using traditional "pen and paper" method, however, there seems to be immense value in leveraging generation friendly mobile technologies like smart phones and tablets which could enhance the learning experience by providing constant access to learning resources and group members. For the purpose of this article, mobile learning means "seamless access to learning resources and social media tools anytime, anywhere". Smartphones are the new internet friendly computer devices which provide access to the virtual resources via wireless and 3G/4G networks. In the next section, I review some research evidence that supports my hypothesis.

Literature Review

There has been a remarkable increase in the use of smartphones as they become more powerful, portable and easy to use.

Definition and impact

In an attempt to define mobile learning and applying its key concepts to learning experiences, El-Hussein & Cronje (2010) disassemble the fixed meaning into 3 concepts - mobility of technology, mobility of student and the mobility of learning process. The authors scrutinize articles in select international journals on mobile learning and find that the mobile nature of the devices integrated with constructivist instruction design would increase student motivation and participation in learning communities. Situated context and ubiquitous mobility are two important features of advanced mobile technologies (Jeng et al., 2010). Mobile technologies can effectively deliver appropriate information to the students during their learning activity. Situated learning provides students with context-aware, authentic learning examples to enhance their learning experience.

Application in medical education

Hauser et al. (2007) conducted a quantitative study in early 2006 to evaluate the effectiveness of PDAs to access MEDLINE (popular medical research database) in clinical settings where there is no wireless access. The evaluators were fairly pleased with the use of mobile devices for providing instant access to latest medical information required for evidence-based practice. Exploring the trends and barriers in learning, Chatterly & Chojecki (2010) organized an online survey in 2008 investigating PDA usage among 571 undergraduate medical students at University of Alberta. The results showed that the students primarily used PDAs for searching drug references and clinical textbooks although they expressed interest in online tutorials, group interactive sessions targeted to the student population.

Zolfo et al. (2010) organized an innovative study on training health case workers in HIV/AIDS clinics in Peru using mobile devices where mobile friendly 3D clinical simulation modules were delivered to physicians using individual smart phones (iPhone and Nokia N95). For each 2-week clinical module, the system provided access to Facebook for case discussions, Skype for tutor feedback and collaboration, Google Docs for content sharing and MLE Moodle for user tracking and outcomes assessment via MCQ based pre and post-tests. The results revealed positive end user experience where students enjoyed personalized learning confirming the value of mobility while accessing educational content.

Limitations

The introduction of mLearning in the mainstream education is fairly recent and there are gaps in existing research that limit the generalization and wide scale adoption. The significant device and service cost, lack of software interoperability, small display size and lack of mobile

friendly content design are some of the limitations flagged by the students. Inspecting the potential of mLearning in pharmacy education, Cain, Bird & Jones (2008) elicit the grounded issues in technology adoption including planning and implementation, faculty buy-in and training, instruction design and curriculum integration, and unintended computer-aided distraction. Professional development of faculty members on effective use of mobile technology is pivotal for its success. Further, it is important to review the instruction design elements to ensure that the content is intuitive and engaging when viewed on mobile devices. Finally, educators need to find strategic ways of avoiding unintended technology distraction caused by introducing these novel devices in classroom which could potentially lead to undesirable results.

Mobile devices provide the desired personalized learning environment (PLE) that allows students to fit learning into their busy schedule. Needless to say, the advent of the iPhone has written in a new chapter in the history of mobile technologies and opened wide range of opportunities for all businesses to reach consumers through their personalized communication toys. The impact has been so powerful that it is completely normal to find students glued to their smartphones and tablets during transit, in the classroom, cafeterias and anywhere in the campus. The teaching and learning potential of these devices is immense although further research is required to address the practical problems and explore models for successful adoption in MDUG.

Method

Participants

The participants for this study will be selected from MDUG year 1 class of 340 students at UBC. Small PBL tutorial groups will be randomly selected to form an experimental group of 20 students. Rest of the class will form the non-experimental or control group.

Instrument

Each member of the experimental group will be provided an iPad tablet connected to campus wireless and 3G networks to resolve software compatibility issues. The independent variable will be an mobile-friendly version of a selected PBL tutorial containing multimedia rich, interactive case content, branching scenarios with decision points, automated tutor feedback, links to online resources and a Twitter group (popular social media application) to allow active peer to peer discussions.

Design

Students in experimental and control groups will be pre tested at the beginning of a PBL tutorial week and post tested during the case wrap-up at the end of the week to get comparative readings on performance over the 1 week period. A comprehensive evaluation survey will be prepared to analyze the overall teaching and learning experience using mobile technologies.

Procedure

At the start of a designated PBL block, students will be randomly selected into small groups via the automated PBL scheduling system. In order to get a representative sample, a few PBL tutorial groups will be randomly selected to form an experimental group (using table of random numbers) to get a total of 20 students. These students will be provided guidance on use of iPads for accessing online resources and social media websites. Required ethics approval shall be taken from the university ethics board along with appropriate student consent prior to the commencement of the study.

I will discuss the research plan with the Associate Director (MDUG) and other relevant academic stakeholders in order to get an academic sponsor and secure funding for a pilot project. Assuming I have the stakeholder approval and funding, I will form a mobile learning working group (MLWG) comprising of subject experts and technical lead. An instructional designer will be contracted to develop an iPad friendly PBL case under the guidance of MLWG for the selected PBL block. A pre-test and post-test quiz will be also be developed to properly compare the effect of the independent variable on student performance. A comprehensive evaluation survey will be prepared to analyze the student and faculty satisfaction.

On the Friday prior to the start of the selected PBL week, an online test will be administered on Friday via the LMS and the pre-test scores will be stored in the student grade book. On Monday of the selected PBL week, experimental group will be provided secure access to an online PBL case accessible via iPad and the student activity will be tracked via the university LMS. The non-experimental group comprising of remaining PBL groups will be provided case instructions in a pdf document downloadable from the LMS at the same time. Both groups will be part of the same 1-week PBL tutorial and will be free to use whatever resources they need to further their learning. Students in the experimental group will be advised to preferably create a Twitter group for online discussions so that the group members can review the latest discussion feed and actively participate in it. PBL tutors will be equally accessible to both groups during the study.

The Learning objectives will be the same for all the students and the tests measuring achievement will be identical. At the end of the selected PBL tutorial week, an online test will be administered on Friday via the LMS and the post-test scores will be stored in the student grade

book. The students in the experimental group and associated faculty members, PBL tutors will be required to submit an online survey to assess the overall teaching and learning experience.

Data Analysis

The student scores will be compared statistically and a t-Test as well as Chi Square Analysis will be included as part of a comprehensive report to analyze and compare the findings to elicit the effect of the independent variable. The evaluation survey results will also be statistically analyzed using the SSIS application to extract valuable information that could inform next steps and overall recommendation to the Associate Director (MDUG).

Timeline

I will develop a 6 month project plan for the implementation of the pilot and the key milestones are shown below:

1. Planning – 1 month
2. Technology Selection – 1 month
3. Case Development – 2.5 month
4. Implementation – .5 month
5. Analysis and Reporting – 1 month

I would like to start the research in the first quarter of the year to be ready for implementation by September when the new session starts.

Budget

Based on the work involved, an initial estimate of the budget is around $50,000. This includes cost of purchasing iPads, software and consulting resources required for case development and

reporting. As 50% of the total budget covers cost of purchasing iPads, I will explore the option to lease them or perhaps repurpose them to decrease the overall cost.

References

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