a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

mLearning for Practice Skills: Using Augmented Reality to Enhance Lab and Clinical Teaching at UBC School of Nursing

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What is Augmented Reality (AR)?

AR identifies physical objects in the world through the lens of a smartphone, or mobile computing device (Wagner & Schmalstieg, 2003). The layering of information over 3D space produces a new experience of the world, sometimes referred to as "blended reality," and facilitates new possibilities regarding access to information, and new opportunities for learning. Using new accurate image and geo-positional recognition technologies objects such as lab equipment can be tagged as a point of interest (POI) using either geo-location tags, by identification of the visual features of the object, or by using embedded smart codes (E.g. bar-codes or Quick Reference QR Codes). Digital data about the object the student is viewing can be superimposed and displayed to them in the lab environment.

We created a range of AR tagged resources for lab and clinical equipment so that students can view these objects using the freely available "Layar" application on their smartphones or tablets. They can see data on how the lab equipment works and instructions on how to use it, with links to clinical multimedia resources (images, text, audio and video clips) associated with the equipment or item and its use. Furthermore, such resources are also being used in problem-based learning strategies. Currently we are using the resources and evaluating them with both students and instructors.

Try AR for Yourself Now!

Download the Layar App and install it on your smartphone or tablet (Android or Apple iOS). You can find it at www.layar.com Then find and scan the AR images and QR Codes on this poster, or this whole poster (you must get the whole image in the Layar frame) to try AR in action.

Rationale

The advent of pervasive computing and clinical simulation has resulted in many new opportunities in lab based clinical skills teaching and learning, but the techniques used to familiarize students with new equipment and procedures have remained fundamentally unchanged for the last 30 years or so. Ranked as an emerging technology by the Horizon Report in both 2011 and 2012(Johnson et al. 2011, 2012), AR is a new technology that turns mobile devices into mobile multimedia networked reference devices. Most students at UBC now own smartphone devices, and there is a need to explore the potential of new AR technologies in mobile implementations to enhance education. Development of clinical skills relies on the processing of observations and information, understanding and using appropriate equipment and observing correct skill performance. Learning is further augmented by the situational and contextual application of the skill.

AR has the potential to be particularly beneficial where students are actually interacting with physical objects to develop skills (Liestøl, 2011), and where the student is required to assimilate the multiple dimensions of an experience in order to successfully learn and apply their skills safely in a clinical setting. Therefore, a clinical skills learning environment is a highly appropriate application. Mobile learning or mlearning aims to provide the learner the ability to assimilate learning anywhere and at any time, and exploits learning with portable technologies. AR technologies represent emerging mobile technologies that have been little explored in the educational arena to date, and this project seeks to explore their potential and identify practical applications for clinical lab-based education, and beyond.

Development & Evaluation

We have created:

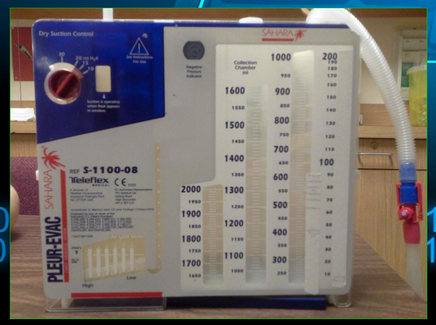
1.Twenty sets of clinical AR resources tagged to 20 different pieces of equipment and,
2.Two AR augmented clinical simulation scenarios.

Four aspects of evaluation are considered and incorporated into this project:

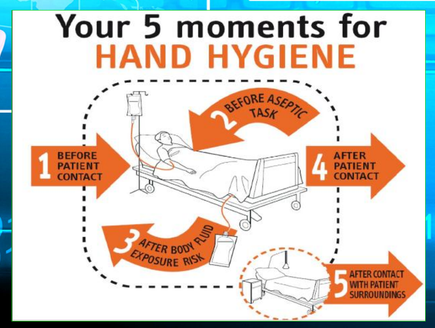
1. Student performance in using the tools to successfully achieve their learning objectives,
2. The level of students satisfaction with the tools/methods used in meeting their learning needs in lab-based skills and clinical simulated practice for their clinical education,
3. Teacher's satisfaction with use of the tools as an augmentation to teaching practical clinical skills and clinical simulated practice for their clinical education,
4. Technical feasibility, reliability and cost-effectiveness of the tools in supporting practical clinical skills and clinical simulated practice education.

A mixed methods evaluation strategy is being employed. Following ethical (UBC BREB) we have recruited volunteer students and are undertaking:

1. A review of clinical lab skills performance and clinical simulations as outcomes for students using these tools,
2. A professional analysis of pedagogical dimensions is of the tools developed by Faculty from the School of Nursing (using educational technology pedagogic dimensional mapping: Reeves & Laffey, 1999),
3. A faculty and student web-based survey exploring their perceptions of the value of AR technologies to support learning, if the technology is easy to use, its cost-effectiveness, and if it facilitates learning and contributes positively to the lab learning experience,
4. A faculty and student focus group to further explore perceptions of the value of these tools, their cost-effectiveness and if they facilitate learning and contribute positively to the lab learning experience.



A Pleur-Vac drainage system: scan this image with Layar to see AR work.



An AR lab poster that links to two videos on hand hygiene; try it out.

An AR lab safety poster: scan this image in Layar to see it work.

References

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Further information

More information on this and related projects can be obtained by contacting Dr. Bernie Garrett at bernie.garrett@nursing.ubc.ca