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Using Co-Design with Nursing Students to Create Educational Apps for Clinical Training

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Abstract. Mobile technology is being trialed in nursing education to support students in clinical practice, as it can provide instant access to high quality educational material at the point of care. However, most educational mobile apps are generic, off-the-shelf applications that do not take into consideration the unique needs of nursing students, who can require personalised software solutions. This study adapted a socio-cognitive engineering approach and through a series of focus groups with final year nursing students explored the co-design process and gained their input on the design and functionality of a clinical skills based educational app. Results showed students required an uncluttered interface that was fast to navigate and easy to use in busy clinical environments. They also requested simple visual descriptions of key clinical skills and equipment to enable them to quickly refresh their memory so they could perform the skill in practice.

Keywords. Nursing student; clinical education; mobile technology; mobile app; co-design; co-production; co-creation

1. Introduction

Nursing students often find clinical practice a challenging environment due to a number of issues that affect their learning processes. These include but are not limited to the theory-practice gap [1], nursing students' lack of experience [2], the ad-hoc nature of learning in acute ward environments [3] and poor clinical supervision [4]. Alternative ways to support the education of undergraduate nursing students in clinical settings include the use of different types of information and communication technologies (ICT) [5]. However, numerous barriers exist for nursing students who want to use ICT in clinical areas such as sharing limited computer resources and having poor digital literacy skills [6].

Mobile technology has been the dominant digital platform over the last decade due to its ever advancing functionality, low cost, portability and ease of use which help address many of these difficulties. As the technology has progressed so has its use in nursing education with Personal Digital Assistants (PDAs), iPods and tablet computers

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all being trialed and evaluated to provide better access to quality educational material for nursing students at the point of care [7].

However, many challenges to using mobile technology in clinical nursing education exist such as a lack of tailored applications that suit the specific needs of nursing students [8]. The aim of this study is to explore the co-design process when creating a clinical skills based smartphone app and identify the features and functions nursing students need in a personalised educational app. User-centred design principles should help to create m-learning solutions that better fit the needs of nursing students and ease some of the pressures they experience training in clinical settings [7].

2. Methods

The study was grounded in the Theory of Mobile Learning (see Figure 1) as it provides a dual framework that on the one hand offers a technological model for software developers to propose design requirements for mobile learning platforms and also provides a communication or semiotic model to better understand pedagogy and learning in a mobile age [9]. Ethical approval for this study was granted by the Social Research Ethics Committee at University College Cork, Ireland. A convenience sample of final year undergraduate nursing students from a Bachelor of Science Nursing programme were recruited to the study via Clinical Placement Coordinators in a local training hospital. Participation was entirely voluntary and the research team was not involved in teaching this group or evaluating their academic or clinical work.

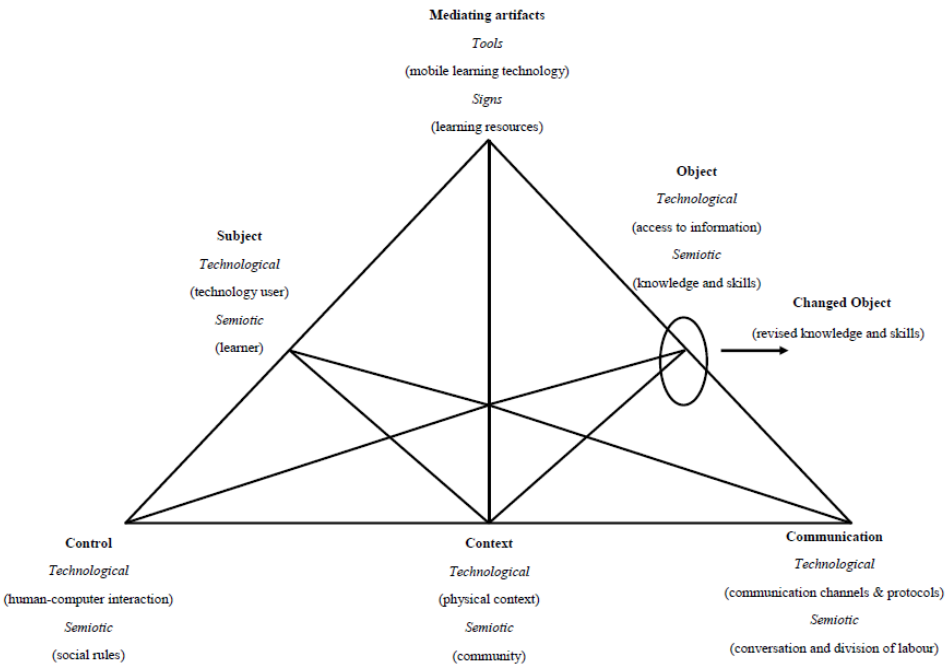

Figure 1: Theory of Learning for the Mobile Age [9]

2.1. Data Collection & Analysis

Two in-depth co-design workshops, lasting 60 minutes each, were held in July 2015 during a continuing professional development day at a local hospital where students were completing their clinical training. Each workshop consisted of ten final year nursing students and a facilitator (SOC). Informed consent was gained from all participants and the discussions were audio-recorded and transcribed verbatim. A co-design methodology was adapted and began with an analysis of nursing students' needs through a general question and answer session. This was followed by discussing specific clinical scenarios and sharing personal stories of learning challenges students encountered in practice. A brainstorming session concluded the workshop which involved drawing design diagrams and brainstorming charts of how the educational app should look and function [10]. Data was analysed thematically using the framework approach [11] and informed by the Theory of Mobile Learning. A thematic coding framework was developed collaboratively by coding, indexing and charting the data into an overarching matrix of themes. QSR NVivo 10 was used to facilitate analysis.

3. Results

The results of the co-production workshops centred around three themes namely; how the app should look and function, what types of educational content nursing students required and how to use the mobile application in clinical settings.

3.1. Design & Functionality

Simplicity in terms of design and function was the overriding factor for students who wanted an app that could be used quickly in clinical areas. Students requested an uncluttered interface which would not distract them from the task of refreshing their knowledge on a particular nursing skill. A straight forward navigational menu and search bar were other items students felt would help them reach educational information they needed quickly. They requested content be presented in an easily understandable format such as images with basic text descriptions, that were free of medical jargon, as they would be quick to review and assimilate.

Short video clips of clinical skills were discussed as another option but some nursing students felt they could be impractical to use as a quiet environment would be necessary to absorb the information. Overall students preferred a streamlined tree like menu structure that could be drilled down to access visual educational material or searched quickly from the main menu (see Figure 2).

3.2. Educational Content

The educational material which was most sought after by nursing students was in relation to pharmacology. Several expressed concern about the complexities of medication management and thought the app could help them prepare and administer drugs more safely. Information on wound care, in particular how to correctly grade pressure ulcers and choose wound dressing, was also highly valued as training material as it would aid decision making and enable students to work more efficiently.

Educational information about more advanced skills and specific pieces of equipment was also requested as nursing students often encountered different versions of the same device across a variety of clinical areas and were asked to perform additional nursing skills in the final year of their training. Other non-skills related content for the app such as a description of medical abbreviations, general anatomy and physiology related to specific diseases and conditions, and information on biochemistry and blood results was also mentioned by nursing students as being valuable educational material.

3.3. Usability

Although the focus of the co-design workshops were to discuss nursing students educational needs in relation to clinical skills and how an app should look and work, aspects related to how mobile applications should be used in clinical practice also emerged. For example, one participant noted that students should inform patients of why they were using mobile technology to avoid any confusion and to maintain the professional image of nursing. Other students felt this should extended hospital wide to circumvent negative attitudes held by some nursing staff and other health professionals in relation to using mobile technology in clinical settings.

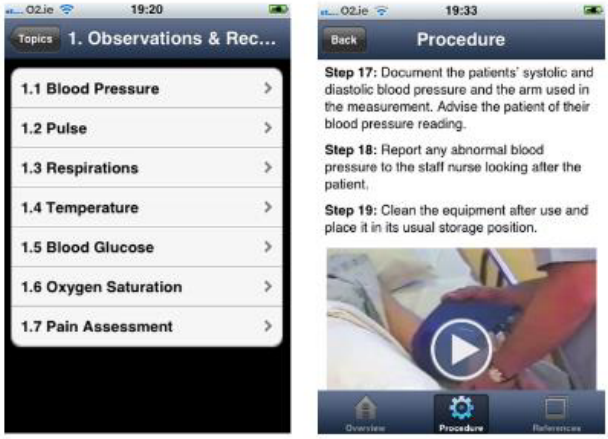

Figure 2. Screenshots of the prototype app as a result of the co-design workshops

4. Discussion

The results demonstrate that mobile devices and educational apps are used within socio-cultural systems and nursing students' educational needs are influenced by established practices in health service settings. Any clinical skills based app needs to ensure students maximise their time and learn the required skills quickly and effectively in busy clinical environments. A preference for visual content, supported with simple short textual descriptions of clinical skills, was highlighted as important as this communication medium would be quick to process and put into practice.

The dialectical relationship between the semiotic and technological systems was also apparent in the type of educational content nursing students required and how they

thought the m-learning platform should be used. Students clearly wanted more control over the educational material available to them and requested detailed step-by-step instructions on how to perform clinical skills as well as additional information on specialised pieces of equipment and more advanced techniques. This could reflect limitations within the context of their undergraduate education and the type of clinical environments students were training in. Finally, nursing students wanted any educational app to be accepted by both patients and health professionals, which would require clear communication about its use to ensure the professional image of nursing was maintained and students were supported to use mobile technology in practice.

The first phase of the co-design process was effective in highlighting the learning needs of nursing students in relation to clinical skills and in gaining their input into creating a personalised mobile learning solution. The next step in co-creating the educational app will encompass a refinement and implementation phase, where detailed use cases and activity diagrams will lead to a specific prototype app and the m-learning system will then be piloted with nursing students in clinical settings and further refined. More research on co-design methodologies and educational apps in nursing education is needed to ensure the right technological systems are created to support student learning in both academic and clinical settings [7].

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References

[1] M.G. Landers, The theory–practice gap in nursing: the role of the nurse teacher, *Journal of Advanced Nursing* **32**(2000),1550-1556.

[2] F. Sharif, S. Masoumi, A qualitative study of nursing student experiences of clinical practice, *BMC Nursing* **4**(2005). 6.

[3] A. Windsor, Nursing students' perceptions of clinical experience, *Journal of Nursing Education*, **26**(1987),150-154.

[4] C. Webb, P. Shakespeare, Judgements about mentoring relationships in nurse education, *Nurse Education Today*, **28**(2008),563-571.

[5] D. Button, A. Harrington, I. Belan, E-learning & information communication technology (ICT) in nursing education: A review of the literature, *Nurse Education Today* **34**(2014),1311-1323.

[6] M. Willmer. How nursing leadership and management interventions could facilitate the effective use of ICT by student nurses, *Journal of Nursing Management* **15**(2007),207-213.

[7] S. O'Connor, T. Andrews. Mobile Technology and Its Use in Clinical Nursing Education: A Literature Review, *Journal of Nursing Education* **54**(2015),137.

[8] P.E. Johansson, G.I. Petersson, G.C. Nilsson, Nursing students' experience of using a personal digital assistant (PDA) in clinical practice - An intervention study, *Nurse Education Today* **33**(2013),1246-1251.

[9] M. Sharples, J. Taylor, G. Vavoula, Towards a theory of mobile learning, *Proceedings of mLearn* **1**(2005),1-9.

[10] D. Millard, Y. Howard, L. Gilbert, G. Wills, Co-design and co-deployment methodologies for innovative m-learning systems. *Multiplatform E-Learning Systems and Technologies: Mobile Devices for Ubiquitous ICT-Based Education: Mobile Devices for Ubiquitous ICT-Based Education*, (2009), 147. http://eprints.soton.ac.uk/267555/1/Co-design_and_deployment_chapter-preprint.pdf

[11] R. Ritchie, L. Spencer, Qualitative Data Analysis for Applied Policy Research, In: M. Hubermann, M. Miles, *The Qualitative Researcher's Companion*, Sage Publications, California, 2002.