



## Informal mobile learning in nurse education and practice in remote areas—A case study from rural South Africa



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### ARTICLE INFO

#### Article history:

Accepted 25 March 2014

#### Keywords:

Educational technology  
Mobile phone  
Mobile learning  
Ubiquitous learning  
Nursing Education  
Rural health  
Distance Education

### SUMMARY

**Background:** With the proliferation of portable digital technology, mobile learning is becoming increasingly popular in nursing education and practice. Most of the research in this field has been concentrated on small-scale projects in high income countries. Very little is known about the ways in which nurses and midwives use mobile technology in remote and resource poor areas in informal learning contexts in low and middle income countries.

**Objectives:** To address this gap, this study investigates whether nurses use mobile phones as effective educational tools in marginalized and remote areas, and if so, how and why.

**Setting and Methods:** In rural South Africa, 16 nurses who attended an advanced midwifery education program, facilitators and clinical managers were interviewed about their use of digital mobile technology for learning. Techniques of qualitative content analysis were used to examine the data.

**Results:** Several rich “organically-grown”, learning practices were identified: mobile phone usage facilitated (1) authentic problem solving; (2) reflective practice; (3) emotional support and belongingness; (4) the realization of unpredictable teaching situations; and (5) life-long learning.

**Conclusions:** It is concluded that mobile phones, and the convergence of mobile phones and social media, in particular, change learning environments. In addition, these tools are suitable to connect learners and learning distributed in marginalized areas. Finally, a few suggestions are made about how these insights from informal settings can inform the development of more systematic mobile learning formats.

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## Introduction

### Mobile Phones and Nursing Education

Mobile phones and smartphones are increasingly popular in nursing education and practice (Garrett and Klein, 2008). They support a broad range of educational practices in formal education settings as well as in clinical environments (George et al., 2010). For example, the use of smartphones by Taiwanese nursing students as clinical examination tools in simulations proved to result in higher learning outcomes compared to a control group who used pen and paper to record and evaluate patient symptoms (Wu et al., 2011). In a British study, multimedia podcasts on iPods were used directly at the bedside to support the

learning of midwives regarding the Newborn Infant Physical Examination (Clay, 2011). The analysis of the small-scale pilot revealed that the tool was well received and the participants specifically appreciated the “just-in-time” learning facilitated by these devices. Similarly, studies from the US and Canada come to the conclusion that nurses and nursing students view mobile devices as effective means to support their learning in the workplace by enabling access to various sources of expertise in decision making processes. Reference tools such as drug and diagnostic/laboratory applications were found to be particularly popular and valued (Garrett and Klein, 2008; George et al., 2010; Kenny et al., 2009).

In addition to the provision of information and communication features, a mobile e-portfolio allowed Canadian students to document their clinical experiences using different modes including text, audio and image. The students greatly valued the reference functions, but also appreciated the opportunity to capture clinical events in the form of photographs (Garrett and Jackson, 2006). The study also referred to the potential of mobile connectivity to prevent isolation in clinical placements. Young et al. (2010) specifically examined this aspect and found that UK nursing students used the texting facility of their own mobile phones as an additional support mechanism to interact with peers and mentors while working in placements. Their findings showed that

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even those students who did not use this facility appreciated it as a potential means of contact when feeling isolated in the clinical placement. Similarly, in another UK study reported by Morley (2013), digital technology was used to support learning in clinical placements and to address professional isolation whereby a range of Web 2.0 tools was piloted to support peer and learner–tutor interactions of nursing students working in isolated placements settings. One of the most popular tools was a Facebook group with high levels of learning interactions. Although the author provides no details, it is noted that students increasingly access this social network site by means of their mobile phones. Mobile phones as educational tools in resource limited settings.

What most of the literature has in common is that the studies were conducted in high income contexts, predominantly in Europe, the US and Australia. Very little is known about the ways in which nurses and midwives use mobile technology in remote and resource poor areas in informal learning contexts in low and middle income countries.

In these countries nurses and midwives have an important role for the delivery of health services and they are considered to be the backbone of the health systems due to a lack of other qualified health professionals (Green, 2006). However, these nurses are often professionally isolated and receive little support and training; many leave the profession or migrate to high income countries (Raisler and Cohn, 2005).

Against this background, international organizations such as UNICEF, ITU and the World Bank have developed high expectations towards mobile phones to support and empower health workers, including nurses and midwives. This is specifically relevant in the context of the Millennium Development Goals, regarding mother and child health and HIV/AIDS. (Holmes, 2010; ITU Press Release, 2010; The World Bank, 2012). However, little is known how mobile devices are being used to support nurses in their learning practices. In an article discussing information technology for nurses, the use of mobile technology is seen as a great opportunity, specifically in Africa. Information and communication technologies in general were deemed as a possible means to address some of the factors to out-migration, such as isolation and lack of educational opportunities (Abbott and Coenen, 2008).

## Methodology

### Research Question and Sampling

In light of the expectations and gaps identified in the literature, the following research question was defined:

*Do nurses in disadvantaged and remote areas use mobile phones as effective educational tools, and if so, how?*

Addressing aspects of maternal and child health, this study was centered primarily on nurses who attended an advanced midwifery education program in rural and disadvantaged areas in a province of South Africa. In contrast to other provinces in South Africa, this setting can be characterized by a high percentage of people living below the poverty line, high infant and adult mortality (Coovadia et al., 2009). Nurses in these settings often work in isolation and have very poor access to post-basic education, continuing education and up-to-date evidence-based information. In order to access education, these nurses are expected to travel far distances away from their place of work and home.

In selecting the people and roles typically involved in nursing/midwifery practice and education, we used typical case sampling (Patton, 1990). To cover a broad range of potential learning practices related to formal education as well as informal workplace learning, nurses in the following roles were involved: (1a) eight registered nurses in formal education settings who attend a decentralized education program for advanced midwifery at a University in South Africa; (1b) these participants worked at the same time as registered professional nurses in clinical settings; (2) four nurse facilitators, who support the midwifery

students in crossing the boundaries between the formal education program and their work; and (3) three nurse managers, who have an overview of work, learning practices and needs of nurses in their clinics. To involve the managers, we visited three sites that represented typical health service centers of rural South Africa. We approached nursing students and facilitators when they gathered for a lecture at the university. In addition, video interviews were conducted using the university's videoconferencing system.

### Data Collection

After obtaining ethical approval from the University, the research team visited three rural sites to interview the participants. Between June and August 2012, 16 participants were interviewed. Before each interview, it was ensured that all interviewees participated voluntarily. In addition, the confidentiality of the participants was ensured and written informed consent was obtained from every participant. All of the participants allowed the conversations to be tape-recorded.

For the semi-structured interviews, an initial question guide was prepared that comprised questions on learning practices in work and university settings, with a specific focus on mobile phone usage and perceived implications.

### Data Analysis

All interviews were audio-taped, transcribed, and analyzed using the software Nvivo Version 8 (QSR International Pty Ltd, Doncaster, Vic, Australia). The analyses followed the principles of inductive category formation, a technique of qualitative content analysis suggested by Mayring (2000, 2004). According to the research question, the selection criteria and the level of abstraction for the categories were broadly defined as socio-cognitive and socio-cultural forms of learning. This is a scope which, according to the mobile learning examples in the introductory literature review, and recent theoretical works (Pachler et al., 2010; Pimmer et al., 2010) is suitable to address the breadth of the educational practices supported by mobile technology. Broadly speaking, socio-cognitive perspectives connect cognitive and constructivist views of learning. Socio-cognitive perspectives emphasize that learning needs to be situated in tasks and problem solving in real-life contexts (Kirschner, 2006). This is of particular relevance for health professions, where much of the learning is routed in the workplace, in the form of authentic and problem-based learning (Norman and Schmidt, 1992; Slotnick, 1999). Socio-cultural learning perspectives are centered on the notion of participation: the main purpose of meaning making and learning is for learners to progress from peripheral to full participation in public and professional life. Lave and Wenger (1991) elaborated their ground breaking theory of community of practice and situated learning using the example of midwives, who 'absorb' skills by participating in communities of practice in resource-poor contexts in Yucatan (Jordan, 1989). Accordingly, the analysis departed from a broad understanding of learning that included work-related learning activities (in particular critical thinking and problem solving) as well as any signs that indicated a participation of an individual in a community of learners and practitioners.

The design, analysis and interpretation were jointly conducted by researchers from nursing/medical sciences and social and educational researchers to prevent researcher and disciplinary bias (Pope et al., 2000). The principal investigator (CP) coded all of the transcripts. Two researchers independently read, re-read and interpreted approximately 25% of the data. The findings were critically discussed by all authors until consensus was achieved. For respondent validation (Mays and Pope, 2000), the interviews were re-conducted with three participants, one facilitator and two students. The preliminary findings were presented to the interviewees and were validated by them.

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