ISSN 1718-9438

Canadian Journal of Nursing Informatics

CJNI, Volume 5 No. 3, Summer 2010, p. 21 – 42 (page 1 of 21)

A Model of Mobile Faculty Presence in Nursing Education Practice

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Introduction

Nursing education practice refers to the placement of nursing students in "authentic" nursing practice situations in hospitals, long term care, clinics, home care and community nursing to apply the knowledge and skills that they are learning in their education program. Some situations are replicated in clinical labs and the classroom in the form of case studies, role-playing, and simulations, but the practice environment is the most authentic form of learning that can and must be provided (Driscoll, 2005). Brown and Collins (1989) concluded that, "situations might be said to co-produce knowledge through activity. Learning and cognition, it is now possible to argue, are fundamentally situated" (p. 32).

Initially preceptorships (student nurse supervision and mentoring by an experienced nurse who practices in the

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ISSN 1718-9438

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assigned clinical setting) were introduced into nursing education programs in final practice courses in order to provide a transition and authentic professional practice experience as the students moved into the role of new graduate nurses.

However, the use of preceptored practice experiences for nursing students has become increasingly distributed across the years of nursing program curricula and across a variety of health related agencies, in response to the shift of care from hospital to community and to the challenge of providing direct supervision in multiple sites. This trend continues to grow as more nursing care shifts to the community and as the number of students in nursing education increases in response to a nursing shortage. The need for increasing numbers of preceptors and the "burn out" experienced by those who preceptor repeatedly, have challenged nurse educators to look for new placements in non-traditional settings, such as women's shelters and day cares and also to consider models of shared supervision of students. One such model is the "Collaborative Learning Unit" where the student is not supervised by an assigned individual but rather by a team on the unit (Budgen & Gamroth, 2007; Finkelman & Keener, 2007).

As faculty work with an increasing number of students who are distributed across practice settings under the direct supervision of one preceptor or a team (often multi-disciplinary), the supervision of students by the faculty becomes "indirect". The instructor (faculty) is not present, "in real-time", at the point-of-care.

There has been growing concern in the nursing education community about the impact of this practice of indirect supervision, from a pedagogical perspective. Preceptors have indicated that, although provided with preceptor orientations and workshops to assist them in working with students, they do not have the pedagogical background to support all aspects of practice education (Myrick, 2002). They supervise by modeling their practice, including their critical thinking, and providing supervision based upon their practice specific content expertise and their past experience. The involvement of the

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practice expert (preceptor, collaborative learning unit or field guide) is important because faculty cannot be physically present at all times and cannot be practice experts in every situation. The faculty role is to build the bridge between pedagogy and practice. Myrick concluded her research report by saying that nursing faculty are indispensable to the success of learning in the practice setting, and that an active role for "monitoring the development and promotion of critical thinking ability in nursing students while they are under the tutelage of preceptors" is valuable (2002, p.162).

Indirect Supervision Model

Within the context of student practice one must consider both the internal and external factors that have an impact on practice. External factors describe the previous knowledge and experiences that the student brings to the practice setting, i.e., program and curricular acquired knowledge, previous practice placement experiences and personal knowledge and life experiences. The student evolves with experience and brings new external factors to each new clinical experience (see Figure 1).

Each practice rotation is a new authentic experience. Learning is embedded in nursing care undertaken in this new physical and social context. Within this context, the student needs to consider further sources of knowledge; that is, content knowledge specific to this practice area that is shaped by the client/patient population, the nurses and other health professionals on the care team and all of their relationships and practices (the culture of the setting).

The agency staff member/preceptor may have little information concerning the external factors, specific to any individual student. Students are expected to prepare for their practice experience by drawing from their previous knowledge and experience (knowing, being, doing and praxis) and providing care in the new situation with input and guidance from the preceptor and/or the agency supervisor. However, the links between external factors and students' learning goals are not always explicitly shared with the preceptor.

The student's implementation of the care

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plan is assessed, or reflected upon, by the student with input from the agency staff, who are physically present in the situation. As the student works to integrate the nursing care experience in this new setting into their existing knowledge base (praxis), the input of the agency staff is required to understand the practices of the situated learning. The student then uses this information to inform their "knowing, being and doing" of this type of situation when they encounter it again.

As the student evaluates and reflects on his/her care in the authentic practice environment, after the fact, the student uses faculty input to understand the practice of the situated learning in the context of the program and the student's progress. The integration of the new practice specific knowledge merges with the external factors that the student will bring to this practice context, the next practice experience and also to future practice experiences.

In an indirect supervision model, faculty input is generally retrospective, in post conferences, written assignments or journals, and site visits in which the faculty member discusses the student's progress with the student and his/her agency supervisor(s).

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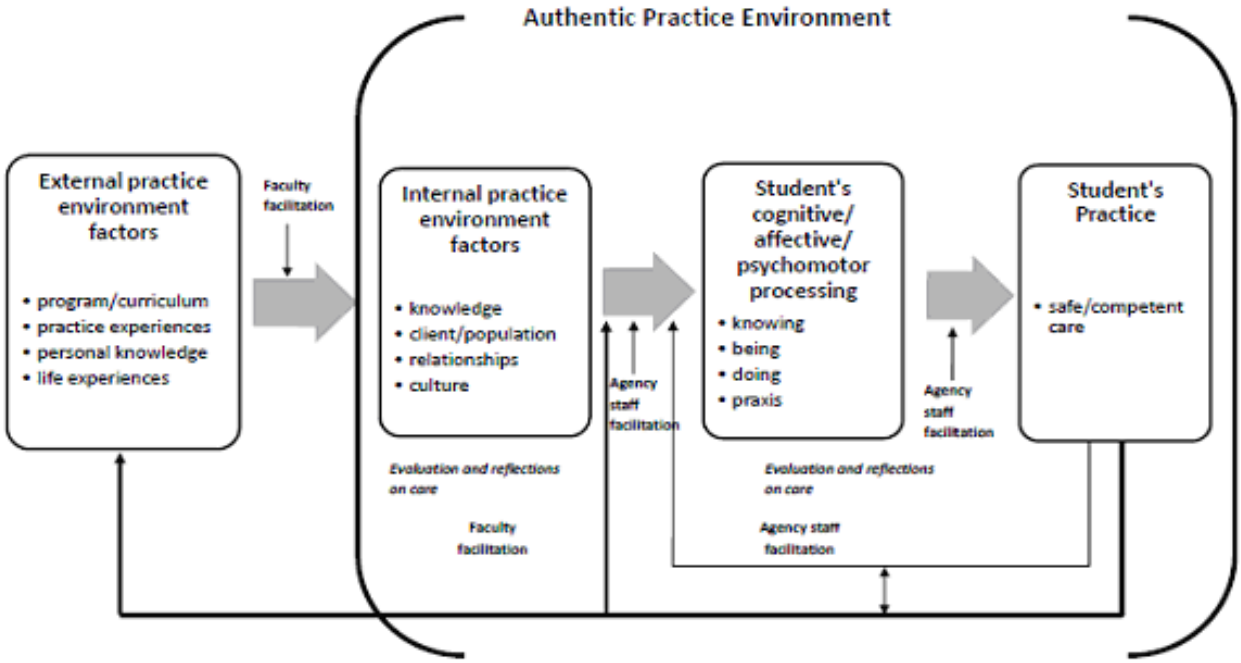

Figure 1. **Indirect supervision practice education model**

Literature Review

Generally, mobile technologies such as personal digital assistants (PDAs), hand-held computers, mobile phones and smart phones have the potential to support learning that is more situated, experiential and contextualized within specific domains and to support the creation and use of more up-to-date and authentic content (Kukulska-Hulme & Traxler, 2005). The nursing practice education model is also situated, experiential and contextualized in that

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learners are practicing with real patients/clients in actual care settings. Is there then a potential for mobile learning to bring the faculty back to the point-of-care in the "just in case, just in time, just enough and just for me" description of mobile learning in education (Traxler, 2007, p.5)?

Nurses are using mobile technologies in their day-to-day practice but not necessarily as mobile communication tools. Nurse practitioners report using PDAs for many purposes: to keep task lists, as memo pads, as calculators, as expense trackers, as calendar/ date books, as patient managers, to access practice reference material, as address/phone books, for information exchange, and for recreational reading, e-mail and Internet access (Cahoon, 2002; Rosenthal, 2003 & Stroud et. al., 2005). Newbold (2003) adds such additional potential clinical applications as interdisciplinary consultations, electronic ordering and test results, patient histories, progress notes and assessments, references, protocols, and prescription information; while nursing instructors have used the devices to keep records of student assignments, checklists for completing physical assessments, as a source of point-of-care reference (drug software) and to document student progress on-the-spot (Lehman, 2003).

Goldsworthy, Lawrence and Goodman (2006) report that student nurses show a significant increase in self-efficacy in their preparation for medication administration while using PDAs and Miller et al. (2005) find that students utilizing PDAs have increasing numbers of questions when in the practice setting, as well as a greater recognition of the need to use current resources. Study of the potential use of mobile technologies for communication has been very limited to date. Newbold (2003) cites uses of mobile technology for clinical consultation and White et al. (2005) report its application in nursing education for instructor-student communication. Technology is no longer optional and we are operating in a different world, a world where connectivity is becoming ubiquitous (Kramer, 2008; Ally, 2008; Prensky, 2008; Engeström, 2008) by blurring the boundaries between formal and informal learning (Triggs, 2008), where the learner is in control of his/her learning, and where the

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teacher becomes a guide to learning (Laurillard, 2008a). How do we guide learning anywhere and anytime using mobile learning technologies? How do educators exploit this emerging trend to meet educational goals? How do we ensure that pedagogical requirements drive the use of the technology and not the reverse?

Laurillard (2008a) makes it clear that educators need to be clearer about what they are trying to do with technology to support teaching and learning. Pittard (2008) states that technology should not be used for the sake of technology but rather to provide what would not have been obtained otherwise. Laurillard (2008a; 2008b) further argues that technological solutions should only be identified and integrated to fully support the learning process after the pedagogical goals are made clear. In this regard, consideration of the potential integration of the use of mobile technologies in an indirect supervision model context has led us to ask the following research questions:

1. Is the use of mobile technology feasible and practical in nursing practice education settings?

2. How can mobile devices be implemented and sustained in indirect supervision models of nursing practice education?

This paper reports on a secondary, post hoc analysis of the data from two previous studies (Park, Van Neste-Kenny, Burton & Kenny, 2007; Park, Van Neste-Kenny, Burton & Kenny, in press) to answer these questions and presents a new, mobile-enhanced, indirect supervision practice education model.

Methodology

In this study, we conducted the secondary analysis of semi-structured interviews conducted in two field trials of mobile learning in 2007. The first set is drawn from a formative evaluation of a 5 week consolidation course held at the end of Year 3, in April - May, 2007 (Park et al, in press). The second set is from an unpublished study of a 14 week, practice rotation course with a different 3rd year cohort, held from September to December, 2007. Both studies received ethical approval from the university and the college participating in

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the study.

Research Setting

Each of the students and faculty in both studies were provided with a Hewlett-Packard iPAQModel 6955, which was based on Windows Mobile 6.0 and provided users with a combined pocket PC computer, mobile telephone and digital camera, as well as both WiFi[1] and GPRS[2] wireless capability. The participants were also supplied with additional software, including the 2007 Lippincott's Nursing Drug Guide, and Davis' Lab and Diagnostic Tests, the Skype audio conferencing program, and Acrobat Reader Mobile.

In each study, the participants took part in a 2 hour orientation session in which they learned how to use the nursing software and application software, as well as how to access the Internet, how to use the mobile telephone feature, how to send email and how to engage in audio conferencing. PDA use could not be a course requirement because there were only enough devices for a volunteer sample. Students were encouraged to explore the potential applications of this mobile technology within their nursing practice and to use them at other times as well. This approach is supported by Song (2007), who reports that students are more motivated by personal use of handheld devices than by using them for assigned learning activities. Semi-structured interviews were conducted with 12 of the participant students and the 6 faculty members involved in the two studies and were transcribed and coded using AtlasTi© software. Each interview was coded by two research team members independently and then the codes were merged. The final codes were negotiated by the research team and consolidated codes were grouped into themes.

[1] WiFi networks are short range, high-bandwidth, networks primarily developed for data transmission. WiFi is a wireless technology brand owned by the Wi-Fi Alliance and uses the IEEE 802.11 standards.

[2] GPRS, or General Packet Radio Service, is a mobile data service available to users of Global System for Mobile Communications (GSM) and IS-136 mobile phones. It provides data rates from 56 up to 114 Kbps. This standard is used by most cellular (mobile) phones and is used to provide wireless voice telephony and broadband wireless data.

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Findings

All but two students and one instructor (a temporary substitute) used the PDAs in a variety of ways and in different situations. They used the nursing software, the application software and the connectivity. The 8 themes identified are described below.

Comfort with Technology

Participants had varying levels of technological proficiency prior to the study. Students who had prior experience with technology, including mobile, found it the easiest to learn to use the device and made the most use of it in practice. In contrast, students who had less experience with technology needed more time in orientation and were less likely to make the time to use these in real-time at the point-of-care. It is interesting that technology savvy students felt they would not have taken on this learning curve if they had not been comfortable with technology, while technological neophytes did in fact volunteer for the study. This leads to the possibility that students volunteered for the study based on reasons other than their comfort with technology.

Device Features

Participants generally agreed that the iPAQs were portable, but they had somewhat varying opinions on the degree of this. They agreed that they were suitable to carry in purse or pocket or clipped to a belt whenever this was feasible, but prolonged carrying in uniform pants pocket was irritating for some. They found that the screens were sufficiently bright and that the colour and type size of the text displayed allowed it to be clearly read except when using non-mobile formatted applications. It became obvious to the researchers that some of the students didn't know to turn off the WiFi and other battery draining functions when not in use. Although the students adapted to the physical structures of the devices, the most frustrating aspects for them was the inconsistent connectivity, the speed of processing and battery life.

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Technical Support

During these studies, the researchers and the faculty in the practice course provided a two-hour orientation to the devices. No technical support was provided by the college and our interviewees indicated that needed no technical support beyond that provided by the instructors. Instead, they referred to the user manual provided or figured out how to use the application on their own. One student did suggest that a help desk and technologically enhanced library support might have been useful.

Use of the Nursing Software

The students reported consistent use of the nursing software at the point- of- care (in situations with a patient/client) to look up drugs, lab results and diagnostic information. The students found it very convenient to have the information at their fingertips and some said that this led them to double check medication information more frequently than they would have using a textbook on the unit.

Students also commented that nursing staff would approach them to look up drugs for them further supporting the importance of having up-to-date information available rapidly at their disposal. As such, the students became a resource for staff and role models in using technology to access up-to-date information. Students further commented that this experience enhanced their sense of being team members and leaders in the practice environment.

Use of the Application Software

Students also made varying use of the application software, such as Pocket MS Office, and of the camera. One student commented on using the device to take notes in the practice setting. Students also used the calendar and task list functions to keep themselves organized. A few students used the camera and one student also used the camera in the context of a "photo voice" assignment for her ethics class.

It is important to note here that during the orientation students and faculty discussed ethical and legal concerns that might arise from the use of mobile technologies and more specifically the use of the camera, in the context of practice and that students

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using these applications did so in the context of agency and college policies. Overall, students using the application software found ways to streamline their practice and course work to avoid duplication and to enhance transfer of information. This saved them time and enhanced confidentiality of information as it limited the numbers of paper-based notes in pockets and binders

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Use of Wireless Connectivity

Students spoke with their faculty, accessed the Internet for resources and downloaded documents in preparation for their practice experiences. Very few students actually used the devices to connect with classmates. Students and faculty also used text-messaging to connect to each other. This was found to be especially helpful when the nature of the discussion or concern could be addressed quickly. An interesting finding was that students stated that if an instructor called them and left a message, they would call her back by phone, but if they were initiating the contact with the instructor, they would text. The reason for texting was that it was viewed as being less intrusive. It could be viewed at any time yet did not require calling in to get voice messages. It also did not require immediate response.

Most of the students also experimented with accessing the Internet using either WiFi or GPRS to look up information in practice or in class. The ability to access resources "just in time" during group work enhanced the learning of the group by providing required information to inform the discussion in real-time. It also made the students' work and learning more effective as they didn't have to go back to look up missing information and come back a week later to discuss further. This more accurately simulates the inquiry process inherent to authentic practice environments.

As previously mentioned with the use of resource software, the student became a resource and role model for staff in accessing up-to-date information to inform practice in real-time at the point-of-care.

Barriers to Full Exploration, Time to Learn and Practice

Our participants voiced a need for a longer

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period of orientation, practice and use of the devices in order to commit to integrating these into their practice. It became evident that for students to use the full potential of these devices, they needed to become comfortable with the various applications prior to using them in the practice area.

Integration into Practice

The participating students were in 3rd year and had already developed other ways to meet the practice requirements without the mobile technology, so they viewed using the iPAQ as additional work and too time consuming to integrate smoothly into their current practice. Practice is viewed by the students as very fast paced with little time at the point-of-care to learn to integrate the technology in addition to the direct nursing care they are responsible for providing. It is evident that these students conceived the use of the devices as an "extra to" and "superimposed on" their practice as opposed to a tool to "integrate with" and as an "essential support to" their practice.

There is a lack of WiFi connectivity in most practice settings and tertiary hospital settings have rules restricting radio and cellular frequency use. When in the hospital setting the students used the nursing resource software frequently but were not permitted to connect to the Internet from the units. As a direct result of the researchers' requests based on evidence in the literature, the hospital rules became less restrictive.

Discussion

The findings of this study demonstrate how the use of mobile devices is implemented and sustained in indirect supervision models of nursing practice. Clearly, the study period was too short, both in terms of time for learning and for use in practice, to allow the participants to feel completely comfort with the devices and therefore to explore their full potential for practice. However, while acknowledging the barriers to use, both students and faculty speak of the potential of the devices as the motivation for their participation in this study. They also speak glowingly about the potential for use in future practice. We believe that the use of mobile devices is feasible and practical in nursing education but that care and planning must be undertaken to normalize the use of mobile devices by both

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students and faculty.

The mobile nature of the devices, and especially the capacity for connectivity with educators from a distance, provides the opportunity to bring back the pedagogical perspective at the point-of-care where it is missing in the current model of indirect practice supervision. As nursing education moves to increase the use of non-traditional practice settings and to increase the use of indirect supervision models, educators need to wrestle with the possible consequences of this shift for teaching and learning. As outlined in the Indirect Supervision Model, the health team, preceptors and field guide all play an important role as subject matter experts within the authentic practice environment.

They can support the student's learning as they plan, implement, and evaluate the care of their clients in that specific setting. However, they generally lack the pedagogical knowledge and experience to fully support students' learning. Moreover, they lack the contextual lens of the external practice environment which is critical to the students' learning over time and across multiple practice settings. Faculty have tended to provide this learning support through retrospective evaluations and reflections of practice with students and including visits in real-time throughout the semester.

However, bringing the broad pedagogical context to the practice setting continues to be a challenge for nurse educators and the use of mobile technologies has the potential to more consistently and purposefully provide this. This would not only help to enhance the students' learning but would also be a support to agency practice staff who do not have the requisite pedagogical context and often feel frustrated that this role is becoming increasingly expected from them. To this effect, mobile learning technologies have the potential to ensure that their role remains appropriate while enabling faculty to support both the agency staff and students by providing the requisite pedagogical and external practice knowledge and skills.

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The students and faculty have commented that mobile technologies that have the ability to provide resources, as well as connectivity with agency staff and educators at the point-of-care, would enhance the students' learning while providing them with appropriate levels of autonomy while ensuring their safety to practice.

In addition, such a model of mobile enhanced shared supervision (see Figure 2) has the potential to further foster evidence and theory informed practice thereby leading to the development of virtual communities of inquiry and practice. Such collaborative practice can only positively contribute to excellence in nursing care. With the appropriate mobile device in the hands of the student and the pedagogical expert, we propose a model in which the instructor communicates with the student, while the student is in the clinical practice area, in a non-intrusive manner. We see this contact as supportive of the integration of the internal factors into the student's care planning and also in the critical thinking phase of the care planning. These would augment the current retrospective input of faculty, after nursing care has been provided by a student. The faculty would also be able to reinforce the pedagogical concepts relevant to this particular clinical practice session, without interrupting the practice session (i.e. by phone).

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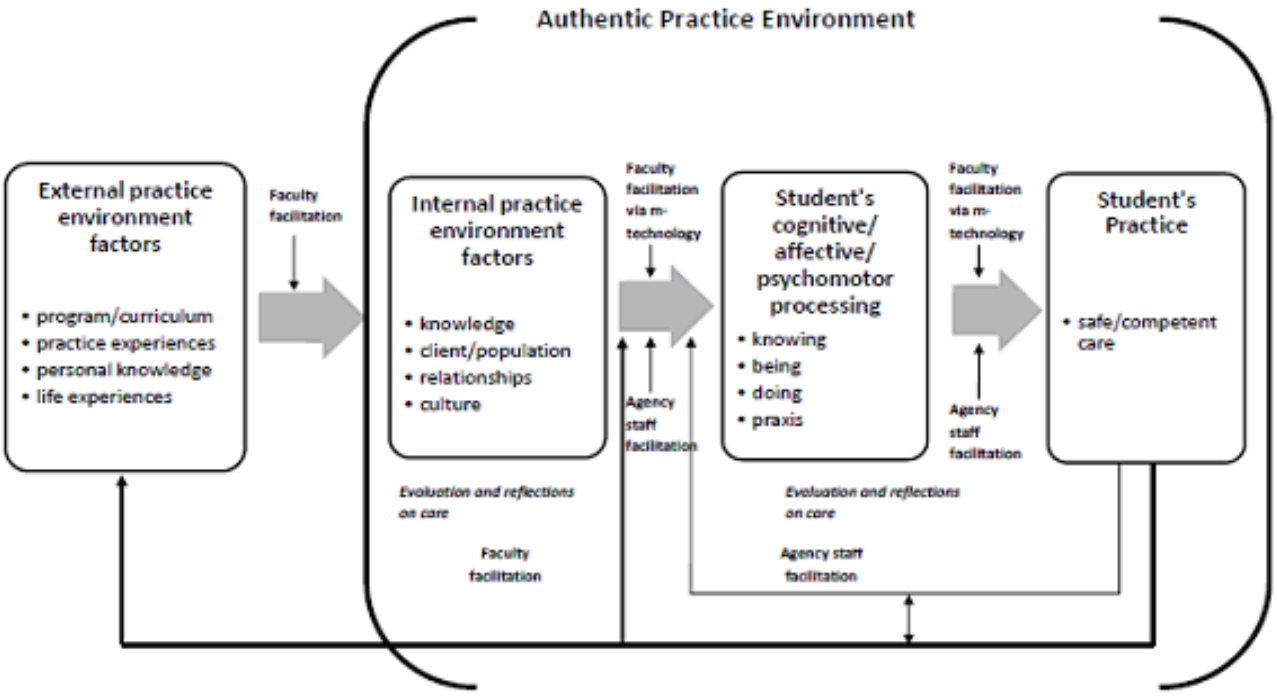

Figure 2. **Mobile enhanced practice education model (MEPE)**

The advent of mobile technology, which can relay communication at the convenience of the student in the clinical setting, thereby not interrupting important student – patient interaction, allows a new entry point for the faculty involved in clinical education. Faculty, who are not physically in the clinical setting can

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retain daily contact with students and encourage higher level thinking by the learner by sending and receiving text messages throughout the student's clinical rotation, without fear of breaking the continuity of the practice. Nursing faculty thus augment the traditional program - curriculum acquired knowledge relevant to the course encompassing the clinical practice, by regularly texting the student about their patient assignment, to encourage critical thinking about their plan of care, and to reinforce the concept of this particular course.

Limitations

Some of the limitations of using mobile devices in the practice setting are highlighted within the themes of the analyzed data. As well, there are limitations for researchers, when student participants and courses are involved. It was not feasible for us to provide a mobile device to every student because of the cost of hardware and connectivity and, therefore, we could not make any learning activity dependent upon the use of mobile technology. This limited the research questions which could be asked and currently precludes a full testing of the mobile enhanced model.

As a result of this work, it has become evident that the potential use of mobile technologies in nursing practice education has remained largely unexplored. Although there are numerous barriers to overcome, especially in regards to connectivity, the opportunities are numerous. Nursing educators have adapted practice education models to respond to contextual pressures such as increasing numbers of students in programs, the faculty shortage, and increased acuity in acute care settings with shifts of nursing care being moved to the community. However, as we have adapted to these shifts and pressures, we have not taken the time to critically question and examine the emerging trends and potential outcomes for practice education. As we struggle to provide pedagogical support in the context of indirect practice supervision models, the risk is to return to an apprenticeship model where educators are removed from the point-of-care and the context of learning in authentic practice environments. In addressing the current,

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emerging and future challenges in nursing practice education, we cannot rely on old tools that we had to solve problems but rather on new tools.

Future Research

From this study, we have made two important observations. The first is that there is potential for an active role by nursing faculty in the development of critical thinking by nursing students in the clinical practice environment even when direct supervision is the role of a preceptor or team. The second observation is that because of the nature of the clinical practice activities, "real-time" interaction (communicating orally with the student) is often difficult. Mobile devices can be employed in practice supervision as a means of asynchronous texting through short message service (SMS), email or voice messaging. This communication is received by the student in the practice setting at a convenient time. Likewise, the student initiates or responds, in a message received by the faculty at their convenience. The frequency of this type of faculty/ student interaction could be pre-determined or dependent upon the practice situation.

This study is only the beginning in the exploration of new social media in clinical nursing education. In future we hope to test the MEPE Model with educators and nursing students in all types of nursing education programming. Faculty and students are using interactive text in social situations and we believe that it will be beneficial in bringing pedagogy back to the bedside in clinical education.

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ISSN 1718-9438

Canadian Journal of Nursing Informatics

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EDITOR: Helen Edwards

CITATION: Park, C., Van Neste-Kenny, J., Burton, P. & Kenny, R. (2010). A Model of Mobile Faculty Presence in Nursing Education Practice. Canadian Journal of Nursing Informatics (CJNI), 5(3). http://cnia.ca/journal/Summer2010/Park.pdf