

**Handheld Computers and  
Baccalaureate Nursing Students:  
Supporting or Hindering Development of  
Caring Relationships with Receivers of Care**

**by**

**Sandra Colleen Theroux**

M.Sc. (Community Health), University of Northern British Columbia, 2001  
B.Sc.N., University of British Columbia, 1978

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in the  
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**Name:** Sandra Colleen Theroux

**Degree:** Doctor of Education

**Title of Thesis:** *Handheld Computers and Baccalaureate Nursing Students: Supporting or Hindering Development of Caring Relationships with Receivers of Care*

**Examining Committee:** **Chair:** Dr. Robin Brayne  
Director of Graduate Programs

**Dr. Michelle Pidgeon**

Co-Senior Supervisor  
Assistant Professor

---

**Dr. June Anonson**

Co-Supervisor  
Associate Professor  
College of Nursing  
University of Saskatchewan

---

**Dr. Cindy Hardy**

Supervisor  
Associate Professor  
University of Northern British Columbia

---

**Dr. Dan Laitsch**

Internal Examiner  
Associate Professor

---

**Dr. Jocelyne Van Neste-Kenny**

External Examiner  
Dean of Health and Human Services  
North Island College

---

**Date Defended/Approved:** July 19, 2013

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## **Abstract**

This study describes the use of handheld computers by nursing students during the clinical component of a four year Canadian baccalaureate nursing-education program. This study examined the relationships that handheld computers had with the ability of third year nursing students to establish and maintain caring relationships. A qualitative case study research design was used. Data were collected including nursing student and patient interviews, documents, and artifacts such as the handheld devices and programs the students used. Findings indicated both caring relationships and technology are of value in nursing care. Students and patients perceived the use of handheld computers as beneficial to student learning in the clinical area. Students and patients also indicated handheld computers supported and had the potential to interfere with third year nursing students' ability to establish and maintain caring relationships. This study supports the use of handheld computers in clinical nursing education.

**Keywords:** caring; handheld computers; nursing; nursing education; clinical nursing education; technology

## **Dedication**

I am dedicating this work to my family and friends. This journey began with their love and support, and they helped me stay grounded in what was really important. To my late husband Steve – without his passion for learning I may never have embarked on this endeavor. To Hector, my new husband who helped me find a way to complete this work. To my three sons Sean, Paul, and Matthew – they grew from youth to adults during this journey and I have every confidence in their resilience and capabilities to succeed in their own life journeys. To my parents William and Josephine who's example was inspiring. To my sisters Margot and Nancy who reminded me to take time for fun and a cup of tea. Thank you also to Patricia and Elda. They gave me ongoing support and encouragement.

My family and friends taught me that life does not take a pause to allow us to complete our work. Instead life's joys, sorrows, and challenges happen in and around our work. They showed me that work is part of life, not apart from it. We cannot wait for life to be perfect before we embark on these endeavors, we need to take on the challenge and persevere.

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## List of Acronyms

|       |   |
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| CARNA | College and Association of Registered Nurses of Alberta |
| CNA   | Canadian Nurses Association                             |
| CNC   | College of New Caledonia                                |
| CNO   | College of Nurses of Ontario                            |
| CRNBC | College of Registered Nurses of British Columbia        |
| CRNM  | College of Registered Nurses of Manitoba                |
| ICT   | Information and Communications Technology               |
| NCBNP | Northern Collaborative Baccalaureate Nursing Program    |
| NLN   | National League for Nursing                             |
| SFU   | Simon Fraser University                                 |
| SRNA  | Saskatchewan Registered Nurses Association              |
| UHNBC | University Hospital of Northern British Columbia        |
| UNBC  | University of Northern British Columbia                 |

## Glossary

|   |   |
|---|---|
| Deductive reasoning                             | A kind of reasoning where a set of premises is set forth from which a conclusion is necessarily drawn. If all the premises of a deductive argument are true, and if the argument is valid, then the conclusion must be true. An argument that is valid with true premises is called sound (Pence, 2000, p. 13).   |
| Induction                                       | The process of reasoning that infers a general statement from a class of specific instances (Pence, 2000, p. 28).   |
| Information and Communications Technology (ICT) | All those digital and analogue technologies that facilitate the capturing, processing, storage and exchange of information via electronic communication. Information and Communications Technologies are computer hardware, software and peripherals; the Internet and its applications like e-mail, e-commerce and e-conferencing; Intranets; satellite broadcasting networks; wireless communication devices, including mobile phones, PDAs and voice mail; DVDs; CD-Roms; digital and analogue radio; television; video; telephones and fax machines (CRNBC, 2009, p. 33). |
| Instrumentalism Thinking                        | The view that scientific theories are not capable of being proven true or false, but are merely instrumental in furthering scientific knowledge; also, the view that such theories should only be seen as instruments in the pursuit of truth, not the grander view that they themselves reveal truth (Pence, 2000, p. 28).   |
| Meaning Unit                                    | In qualitative research, a section of text that contains one item of information that is comprehensible for purposes of data analysis even if read outside the context in which it is embedded (Gall, Gall, & Borg, 2007, p. 652).  |
| Phronesis                                       | Practical wisdom (Reese, 1996, p. 580).   |
| Techne  | The knowledge and application of principles involved in the production of objects and the accomplishment of specified ends. Techne implies the application of principles and relates to productive science (Reese, 1996, p. 761).   |
| Telos   | End or final purpose (Pence, 2000, p. 52).  |
| Theory-based sample                             | (Or operational construct sample). A group of cases that exemplify a particular construct in a theory (Gall et al., 2007, p. 656).  |
| Unit of Analysis                                | In case study research, the aspect of the phenomenon that will be studied across a sample of cases (Gall et al., 2007, p. 657).   |
| Virtues   | Excellences of character that include courage, wisdom, self-control, and justice, as well as other admirable traits such as loyalty and compassion (Pence, 2000, p. 55).  |

# Chapter 1.

## Introduction

The study completed for this dissertation examined the relationship that handheld computers had with the ability of third year nursing students to establish and maintain caring relationships, specifically in the context of a four year Canadian baccalaureate nursing-education program. This chapter situates the researcher, and outlines the research problem, the purpose of the study, and the research questions. It also includes a discussion of the nature of nursing, the concept of “caring” in the nursing context, and explores some of the challenges technology poses in the health-care environment.

Entry-level registered nurses are expected to provide a caring environment for patients, to possess basic computer literacy, and to be aware of information and communications technology (ICT). The *National Competencies In The Context of Entry-Level Registered Nurse Practice* (hereinafter referred to as “the Competencies document”) identifies that new nursing graduates are required to provide a caring environment that “supports clients to achieve optimal health outcomes, goals to manage illness or a peaceful death” (College of Nurses of Ontario [CNO], 2008, p. 14). As well as providing a caring environment, nurses are expected to understand and utilize technologies that “change, enhance or support nursing practice” (CNO, 2008, p. 8). The Competencies document contains competencies which were updated for national use and were approved by the CNO (2008) for use in Ontario.

In addition to the expectation to develop caring and technology-based skills, nurses are expected to locate and incorporate current and relevant research into their practice to build evidence-informed care. Johansson, Petersson, and Nilsson (2011) conducted a study describing one nurse’s experience of using a PDA in practice using a single case study with one open-ended interview. They found the increase in health-



related knowledge requires nurses to handle large amounts of information which generates the need for ICT (Johansson et al., 2011). However, many nurses may not have the resources or the time to access current research in the clinical setting.

The purpose of caring is to preserve the wholeness and dignity of humanity (Kelley & Johnson, 2002). "Nursing's values, knowledge, and practices of human caring were geared toward subjective inner healing processes and the life work of the experienced person" (Watson, 2006, p. 296). Watson (2006) sees that nursing's social, moral, and scientific contributions to humankind and society lie in its commitments to human care ideals in theory, practice, and research.

Watson (2006) sees human caring as central to nursing, and a transpersonal caring relationship as a foundational concept. Watson (2006) claims "Transpersonal caring seeks to connect with and embrace the spirit or soul of the other through the processes of caring and healing and being in authentic relation, in the moment" (p. 299). The nurse's moral commitment is to protect, enhance, promote, and potentiate human dignity, wholeness, and healing (Watson, 2006). This relationship calls for the nurse to be present and enter and stay within the other's frame of reference. The nurse's intentionality is focused on caring, healing, and wholeness, rather than illness.

In his article examining the culture of technology in nursing, Locsin (2001) identifies the "discord existing between the emphasis on proficiency with technology and the expression of caring in nursing" as "dichotomous concepts of practice" (p. 3). Musk's (2004) article examines the apparent role conflict created by the need for nurses remain caring as well as be technically competent. Musk (2004) questions whether this conflict between caring roles and technology "is a true reflection of modern day nursing practice" (p. 13), and points out that caring may include technological competence. Immediate access to information from handheld computers can benefit nursing practice (Johansson et al., 2011). Simpson's (2004) article explores cultural diversity in the information age through the diversity of roles within a multi-disciplinary care team. Simpson claims technology can help nurses care better because technology gives nurses the time and tools to be more caring. Drumm and Chase (2010) conducted a study that investigated the lived experience of nursing students learning caring. The sample consisted of seven senior baccalaureate nursing students and "data were analysed using Colaizzi's (1978)

seven-step procedure” (Drumm & Chase, 2010, p. 32). In this study, formulated meanings included “a caring nurse knows the value of spending time with the patient” (Drumm & Chase, 2010, p. 33). Drumm and Chase also pointed out that meaningful relationships between nurses and patients are important to patients, rather than the amount of time nurses spend with them.

Nurses however, may not be able to use the time provided by technology to spend more time with the patient. Barnard’s article (2002) explored “the background and significance of philosophy of technology as a focus of inquiry emerging within nursing scholarship and research” (p. 15). He commented the introduction of new technology places additional demands on nurses (Barnard, 2002). Hjalmarsson (2009) found handheld computers were not used to support care-giving work with patients, but rather were “an instrument of registration and control by the management” (p. 382). Hjalmarsson conducted an ethnographic study of the introduction of handheld computers in a working team in home help services. The working team consisted of 12 women with varied levels of education and varied work experience (Hjalmarsson, 2009). She concluded handheld computers drew carers’ attention away from the “rationality of caring by using it to structure work hours” (Hjalmarsson, 2009, p. 383). Simpson (2001a) comments that technology has not replaced human caring, nursing’s most valued contribution to health care. It is clear that there needs to be a balance between compassionate care and advanced technology (Ward, 2002). It is also clear that technology in health care has had a mixed impact on nursing (Musk, 2004).

According to Musk (2004), in spite of the apparent opposite natures of technology and nursing, it is worthwhile for nurses to question how technology can be used to enhance practice. Barnard (2002) recommends finding a balance between an uncritical celebration of technology and generalizations about dehumanization, by critically reflecting on the specific relations between technology, nursing, and healthcare. Rather than a more quantitative investigation of the uses and benefits of technology, what is needed is a reconsideration of the nature of nursing and the use of technology within that context, keeping in mind the development of better nursing education programs.

Fjelland and Gjengedal's (1994) article discusses the theoretical foundation for nursing as a science. Any study concerning nursing science needs to contribute to better nursing practice, while also exploring the nature of "good nursing" (Fjelland & Gjengedal, 1994). Benner and Wrubel (1989) base their view of nursing practice on MacIntyre's (1984) premise that practice is a systematic whole, with a notion of excellence inherent in the practice itself. However, the question of what constitutes "good nursing practice" is not exclusively based in technology today, any more than it ever was. "Good" in nursing practice is also rooted in what is morally right, for example. Taylor (2004) discusses the concept of moral background and natural rights, and points out that people have certain moral obligations toward each other, and that fulfilling these obligations brings common benefits. Nursing practice is therefore not merely an applied science or technology but a moral art.

## **1.1. The Researcher**

My interest in this study is founded in my practice as a bedside nurse, a nurse educator, and as an administrator. During this study, I was an Associate Dean of Health Sciences at a college which offers the first two years of a four year Canadian baccalaureate nursing-education program. Previously I was an instructor in this nursing program, formerly held an adjunct position at the university that offers the third and fourth years of this nursing program, and formerly worked as a staff nurse at a hospital. I have many years of experience working with patients, as well as nursing students in theory, lab, and clinical settings. A handheld computer project initiated by the college where this study took place sparked my interest in exploring caring and nursing students' use of handheld technology during their clinical experiences.

As part of a leadership initiative, in the 2003-2004 academic year, the College of New Caledonia (CNC) initiated a pilot Personal Digital Assistant (PDA) project (Anonson, Conroy, Healey-Ogden, Palmer, & Shawara, 2005a). The aim of this project was to encourage faculty and students to "become more familiar with a technological aid to improve their clinical practice" (Anonson, Lynch, Steindl, & Simon, 2005b, p. 3). The College provided nursing students with handheld computers called Palm Pilots for their work in the clinical area. These students used the Palm Pilots as a resource — for

example, to access a drug reference guide. Although it was not the intent of the project, students used the Palm Pilots in their classes, as well. Approximately 33% of the second-year students and approximately 80% of the faculty utilized PDAs during the project (Anonson et al., 2005b). Over 90% of the students in the study said that they found the PDA was beneficial. Students also said the PDA “gave them an advantage because they had information at their fingertips, and more time to spend on direct patient care instead of on searching for resources” (Anonson et al., 2005b, p. 8).

## **1.2. Purpose of the Study**

The purpose of this case study was to examine the relationship that handheld technology had with the ability of nursing students to establish and maintain caring relationships with patients. The nursing students who participated in the study were enrolled in the third year of a Canadian baccalaureate nursing education program. The study focused on nursing students’ use of handheld computer technology during their clinical practicum experiences. The study’s focus on handheld computers is consistent with the definition of ICT included in the Glossary.

This study used theories related to the concept of “caring” to frame the issue of technology in nursing education and guided the research questions. Benner and Wrubel (1989) stated that theory is derived from practice. The practical world is more complex than can ever be fully captured by theory; however, theories provide guidance to nursing students and novice nurses to enable them to develop expert practice over time (Benner & Wrubel, 1989). Theory frames issues and guides questions and expert practice develops clinical knowledge that can help inform theories. These all contribute to the enhancement of patient care, thus making the effort worthy of pursuit.

## **1.3. Research Questions**

The question guiding this study was: How does the use of handheld computers by a group of baccalaureate nursing students in a Canadian pre-service program

support or interfere with their ability to establish and maintain caring relationships as a key competency? Sub-questions examined within this study were:

- How do nursing students and patients describe “caring”?
- What are the nursing students’ and patients’ perceptions about the use of handheld computers in supporting or interfering with caring relationships?
- How do nursing students and patients describe the relationship of handheld computers with student learning about caring practice?

## **1.4. Entry-Level Competencies**

The Jurisdictional Collaborative Project that created the Competencies document used a standards-based conceptual framework to organize the national entry-level competencies into five categories: “professional responsibility and accountability; knowledge-based practice; ethical practice; service to the public; and self-regulation” (CNO, 2008, p. 6). The conceptual framework identified the client (patient) as being of central importance to nursing practice. The four competencies on which this study focused fell into the following three categories: professional responsibility and accountability; knowledge-based practice; and ethical practice.

This study focused on two competencies addressing caring aspects of nursing; these both fell under the category of “ethical practice.” These two caring competencies require that the registered nurse “establishes and maintains a caring environment that supports clients to achieve optimal health outcomes, goals to manage illness or a peaceful death” (CNO, 2008, p. 14), and that the registered nurse “engages in relational practice through a variety of approaches that demonstrate caring behaviours appropriate for clients (e.g., speech, touch, disclosure, confrontation and counselling)” (CNO, 2008, p. 14). These competencies emphasize the importance of the caring aspects of nursing and establish the requirement for nursing students to develop these aspects. The Competencies document identified that both the caring relationship between the nurse and the patient and the ability to utilize technology are important (CNO, 2008).

As well as the two caring competencies, two entry-level technology competencies that this study focused on were categorized under “professional responsibility and accountability” and “knowledge based practice” (CNO, 2008, p. 8).

These two technology competencies require that the registered nurse “demonstrates critical inquiry in relation to new knowledge and technologies that change, enhance or support nursing practice” (CNO, 2008, p. 8); and that the registered nurse “understands the significance of nursing informatics and other information and communications technologies (ICTs) used in health care” (CNO, 2008, p. 10). These national competencies highlight the necessity for new graduate nurses to have knowledge about technology and the ability to use it.

This study examined the competency documents from the regulatory associations or colleges from five provinces in Canada: College of Nurses of Ontario (CNO); College of Registered Nurses of Manitoba (CRNM); Saskatchewan Registered Nurses’ Association (SRNA); College and Association of Registered Nurses of Alberta (CARNA); and the College of Registered Nurses of British Columbia (CRNBC). The competency documents from the four western provinces were chosen because the study was conducted in a Canadian western province. Ontario was also included because Ontario has adopted the national competencies and therefore, included the four competencies that were assessed in this study. These four competencies were also included in the competency documents from British Columbia’s “Competencies in the Context of Entry-level Registered Nurse Practice in British Columbia” (CRNBC, 2009), Alberta’s “Entry-to-Practice Competencies for the Registered Nurses Profession” (CARNA, 2006), and Manitoba’s “Entry Level Competencies for Registered Nurses in Manitoba” (CRNM, 2007). The competency document from Saskatchewan (SRNA, 2007) “Standards and Foundation Competencies for the Practice of Registered Nurses” included three of the four competencies but did not include the competency regarding engaging in relational practice. The inclusion of these competencies in the documents from the five provinces that were examined supports the importance of these competencies to nursing practice and education of nursing students within Canada.

## **1.5. Caring Recognized**

### **1.5.1. *Challenges of Recognizing Caring***

Although nursing is described as a caring profession and caring is viewed as a core value of nursing and an essential component of nursing education, there is no agreed upon definition of caring. In a pilot study that examined students' perceptions about the concept of caring, 14 nursing students met with three clinical nurses who shared their stories about caring practice (Adamski, Parsons, & Hooper, 2009). Students expressed that caring was about developing trust, listening, being there for patients, being open and non-judgemental, having confidence, keeping current, and doing the right thing (Adamski, et al., 2009). One student commented that "caring is the utmost importance, with the focus being on the patient and not the nurse" (Adamski et al., 2009, p. 360).

These findings are in contrast to a study where students perceived emotional caring behaviours such as a trusting relationship and patient comfort as the least important, and practical and cognitive caring behaviours such as having adequate knowledge and skills as most important (Khademian & Vizesfar, 2007). The aim of this study was to determine the nursing students' perception of the importance of caring behaviours, had a cross-sectional comparative-descriptive design, and participants were nursing students recruited from a university-based nursing program in Iran (Khademian & Vizesfar, 2007). Ninety students (response rate 75%) responded to a questionnaire consisting of 55 caring behaviors (Khademian & Vizesfar, 2007). As evident by these varying findings, the concept of caring is complex and recognition of caring is challenging.

The concepts of "caring" are explored through the work of Tarlow (1996), Noddings (1984), Watson (2006), Benner and Wrubel (1989), Benner and Gordon (1996), and others. For this study, the work of these theorists guided the research questions as outlined in Chapter 1, guided the development of the framework for how "caring" was recognized in this study as outlined in Chapter 2, and guided the analysis of the concept of "caring" as outlined in Chapter 4.

### **1.5.2. *Caring Concepts***

According to Tarlow (1996), Watson (2006), Noddings (1984), Benner and Gordon (1996), and Benner and Wrubel (1989), caring can only be effectively demonstrated and practiced interpersonally. In this study, the concept of caring was examined in the context of the relationship between the patient and the nursing student, or between the patient and the nurse. Tarlow examined relationships of caring in different contexts to increase understanding about its unique and universal characteristics. The purpose of Tarlow's research was to generate a full, grounded, and theoretically useful concept of caring. Tarlow researched three subsamples – families, schools, and voluntary agencies with a total of 84 participant interviews. Tarlow's eight caring concepts emerged from her research interviews and formed the basis of how caring was recognized in this study. Tarlow's (1996) caring concepts "constituted overlapping phases of the caring process: time; be there; talking; sensitivity; acting in the best interest of the other; caring as feeling; caring as doing; and reciprocity" (p. 57). In addition to these eight concepts, caring was also examined in terms of what is "non-caring" (Noddings, 1984; Watson, 2006) and self-care of the nurse (Benner & Wrubel, 1989; Noddings, 1984; Rieman, 1986).

## **1.6. The Ethic of Caring and Nursing Practice**

The standards-based framework used to organize the entry-level competencies shows the client (patient) is of central importance to nursing practice (CNO, 2008). This framework indicates that the nursing profession continues to stress the care of the patient as central to nursing practice. According to Benner (1994) care is a way of being that must be understood, preserved, and enhanced in health care in general and by nursing as a caring practice. According to Watson (2006) caring is the essence of nursing and can only be effectively demonstrated and practiced interpersonally.

The ethic of caring must be related directly to the standards of the profession and cannot be confined to abstract discussion (Thomasma, 1994). The ethic of caring cannot survive in nursing unless nurses themselves insist that caring is central to their role. Ethical practice is one of the four professional nursing standards in British



Columbia: the nurse “understands, upholds, and promotes the ethical standards of the nursing profession” (CRNBC, 2012a, p. 14). In addition, nurses are accountable for upholding ethical responsibilities as outlined by The Canadian Nurses Association’s (CNA) *Code of Ethics for Registered Nurses*. The CNA code of ethics is organized in two parts. The first part of the code describes the seven core values that are central to ethical nursing practice:

1. Providing safe, compassionate, competent and ethical care
2. Promoting health and well-being
3. Promoting and respecting informed decision-making
4. Preserving dignity
5. Maintaining privacy and confidentiality
6. Promoting justice
7. Being accountable

The second part of the code addresses “ethical endeavours with respect to broad societal issues” (CNA, 2008, p. 3). These are activities that nurses can undertake individually and collectively to address social inequities. An example of this activity is “working collaboratively to develop a moral community” (CNA, 2008, p. 21). According to the CNA (2008) code of ethics nurses are moral agents and are responsible for providing ethical and compassionate care.

## **1.7. The Requirement of Technology in Nursing**

Use of ICT is not a choice for nurses but a requirement of practice. Almerud, Alapack, Fridlund, and Ekebergh’s (2008) article discussed how care in technologically intense environments becomes beleaguered. While Almerud et al. argued the carer can never be substituted by technology, Crow (2001) explained, “[i]t is unlikely that many, or even most, of the functions provided by nurses will be replaced with technology, however, it is likely that nurses who do not adapt to technological advances will be replaced by those who do” (p. 15). One purpose of Crow’s article was to create a better understanding of how caring practice settings are critical to nursing’s core mission of caring. Nursing graduates need these technological skills to make significant

contributions to the design, development, and implementation of clinical information and decision support systems (Feeg, 2004). New graduates are expected to use appropriate technology to perform safe, effective, and efficient nursing interventions; select appropriate technology in accordance with available resources and client needs; and use computerized and other health and nursing information systems to plan and coordinate care.

Technology-based learning fits within nursing practice and nursing is best positioned to facilitate the implementation of technology into health care by virtue of knowledge of patient care and proximity to the patient (Feeg, 2004; Smith, 2004). Nursing education leaders need to commit to producing a significant number of knowledgeable professionals who will serve in a range of important roles relating to the use of informatics in clinical practice, management, and leadership. This requirement for technological skill is proscriptive in the general but not in the particular. Clearly, knowledge of technology is necessary, but does this translate into a requirement for the use of handheld computers in the clinical area?

### **1.7.1. *Challenges and Benefits of Handheld Technology in Nursing Practice***

While patients may benefit from the use of handheld computers, challenges may arise. Cornelius (2005) studied the benefits of introducing a handheld computer assessment tool into undergraduate nursing education as a means to enhance the development of clinical decision-making skills of nursing students. Twenty-six senior nursing students and two faculty participated in this study (Cornelius, 2005). “This case study used qualitative and quantitative methods, including field observations, ‘on-the-spot’ informal interviews, and a follow-up phase of in-depth interviews” (Cornelius, 2005, p. xi). She found that handheld technology could be a barrier to nurse-patient interaction. About two-thirds of the students in the study reported that use of a handheld computer interfered with patient interactions and was a barrier to establishing rapport (Cornelius, 2005). It is perhaps worth noting that students were new users of the assessment tool and their lack of familiarity with the tool may have negatively affected the interaction between the students and the patients. In addition, Cornelius found that elderly patients were not familiar with technology in general and this may have made

their experience with handheld devices stressful. These factors may have interfered with building rapport. Cornelius (2005) recommended further research concerning the effect the handheld computer may have upon nurse-patient relationships because “establishing effective interpersonal relationships is essential in nursing practice” (p. 101).

Ruland (2002) evaluated nurses’ use of a handheld computer-based support system for preference-based care planning, which assists nurses in eliciting patients’ preferences for functional performance at the bedside. Ruland’s study had a three-group sequential design with one intervention and two control groups (N=155). In the intervention group, nurses elicited patients’ preferences for functional performance with the handheld computer system as part of the usual admission interview (Ruland, 2002). This study failed to identify an effect on patients’ satisfaction and did not find an improvement in the physical functioning of the patients (Ruland, 2002). However, Ruland claims use of the handheld-computer system improved patient-centred care and patient outcomes and has potential to be included in clinical practice as part of nurses’ routine care planning. Ruland’s study supports the conclusion that the use of the handheld computer makes nursing care more consistent with patient preferences. Smith (2004) and Stein and Deese (2004) commented that providing nurses access to information through technology allows them to focus on direct patient care and enhances patient safety. Clearly these contrasting findings and opinions highlight the need for additional investigation, particularly given the advances in technology since these research projects had been conducted.

Health-information technology will transform the delivery of health care (Feeg, 2004). Nurse leaders are compelled to explore ways that technology can support not only improvements in educational methods, but also meeting other professional challenges. These challenges include managing workforce shortages into the future and supporting nursing practices and care delivery (Smith, 2004; Stein & Deese, 2004). In addition, the use of technology contributes to meeting the goals of the organizations’ strategic business plans, such as improving efficiency and justifying costs (Smith, 2004; Stein & Deese, 2004). However, some of the claims made in favour of technology, such as reduction in staff workload and cost savings are difficult to substantiate (Lewis,

Davies, Jenkins, & Tait, 2005). Lewis et al. reviewed evaluative studies of computer-based learning in nursing education.

Thomasma (1994) feels that nurses, dedicated to enriching their professional abilities, are focused on technology to a greater extent than in the past, to the detriment of the primary healing relationship between the nurse and the patient. Kerr and Sirontnik (1997) commented that technology can endanger nursing care when the nurse's attention turns toward the equipment rather than to sustaining the relationship between the nurse and the patient. Benner and Wrubel (1989) point out that caring practice is overlooked and devalued in a culture that values technological advances and they argue that these advances are dangerous without a context of compassionate care. In Simpson's (2001b) article discussing compassion in the age of computers, he comments there is a risk that technology could lead to minimized human interaction (Simpson, 2001b). Caring practices cannot rely on the notion of a technological view of the person.

The design and control of health care is based on the monetary value of treatments provided. Caring is difficult to define, and therefore, difficult to document and quantify (Simpson, 2001b). Caring practices are not easily counted and tend to be marginalized. This focus on the economics of health care can be in opposition to the skilful ethical behaviour of nurses who have ideas about what is required to provide "good" care for patients (Benner, 1994). Dunlop (1994) pointed out that if caring were the sort of entity that could be divided and analyzed in parts and described in terms of universal rules, caring could be computerized and nurses could become obsolete. "Nurses need to preserve and document their unique culture of caring" (Simpson, 2001a, p. 86). Watson's caring theory aims to help nurses develop a philosophical and moral base for their practice; however, implementing Watson's caring framework is challenging due to barriers created by a health care system guided by a different set of values, such as economics and technology (Neil, 2002).

In order to subordinate technology appropriately to the concerns of humans from a stance of care one must decide when use of technology is appropriate (Benner & Gordon, 1996). Watson's caring theory "directs the focus back onto the person and mandates that technology be used selectively for the betterment of humankind rather than the sole guiding factor in healthcare" (Kelley & Johnson, 2002, p. 421). Technology

can be valued for what it can do to improve nursing practice and education, and to lessen suffering of the patient, without limiting our ability to critically question use of technology in the provision of care.

Nursing and nursing education must be more than the sum of the parts – science and art. Nursing is more than the use of technology and evidence-informed practice. Nursing is also more than hope, caring, virtues, and healing. The ends (the good of humankind) and means (the journey to get there) cannot be separated in nursing or nursing education. Nurses are physically present for the person's journey of healing or dying: nurses provide care, intimate contact, and hope; they are with the patient in a profoundly personal way. Nurses use not only their evidence-informed scientific knowledge, but also the virtue of caring to provide a service to the public – to achieve the end: the good of humankind.

### **1.7.2. *Challenges and Benefits of Technology in Nursing Education***

Technology can support nursing students' learning by providing much of the scientific information about best practices they need to make decisions about patient care. A handheld computer is an effective tool for accessing information (Ruland, 2002), and it is clear that information is critical to assist students to provide safe, competent patient care. Miller et al. (2005) conducted a study to explore second-degree baccalaureate nursing students' information seeking behaviours, and the effectiveness and costs associated with incorporating PDAs into clinical practice using a pre-post and comparative group design. Thirty-seven second-degree students in the 14-month accelerated baccalaureate nursing degree option were required to purchase PDAs, while 21 second-degree students in the 24-month option were the comparison group (Miller et al., 2005). According to Miller et al. the majority of nursing students in both options were active seekers of information. The nursing students with handheld computers had a greater recognition of the need to use current resources, which conveys "the professional value of seeking information for use at the bedside" (Miller et al., 2005, p. 26).

Altmann and Brady (2005) conducted a descriptive study regarding the ability of nursing faculty and students to efficiently obtain accurate information at the point-of-care

through the use of student and faculty surveys. One hundred and ninety students (74.9%) in four semesters responded to the survey, of whom 119 (64%) owned a PDA (Altmann & Brady, 2005). Thirty-four faculty (72%) responded to the survey, and 19 (56%) owned a PDA (Altmann & Brady, 2005). Altmann and Brady (2005) found handheld computers facilitate nursing student learning because they provide access to accurate information at the “point-of-care” (p. 1). Gosling, Westbrook, and Spencer, (2003) investigated factors influencing nurses’ use of online evidence available at the point-of-care and examined differences between nurses in different roles. Nurses from 65 randomly selected hospitals were surveyed using a convenience sample of nursing staff with 3128 completed surveys returned (Gosling et al., 2003). Gosling et al. concluded provision of resources electronically at the point-of-care may assist in overcoming the barriers of accessibility and the limited time nurses have available to find information.

Cornelius (2005) found that handheld technology helped to develop clinical competency in students. Wu and Lai (2009) incorporated the use of PDAs in a clinical practicum and evaluated the effectiveness of the handheld environment with six student participants in a clinical practice area. Wu and Lai focused on students’ feedback regarding the features of the PDA, the benefits of the PDA-supported practicum, and issues. Data sources included students’ reflective journals; open-ended questionnaires answered by students, the instructor, and four nurses who worked on the same ward; interviews with the students and the instructor; and field observation journals (Wu & Lai, 2009). Wu and Lai found students using handheld computers during a clinical practicum were better at integrating theories into practice, their learning was better organized, and students were more engaged, self-directed, and confident. Koeniger-Donohue (2008) reported on a PDA pilot project she conducted using participatory action research with six graduate nurse practitioner students in her clinical decision making seminar. Koeniger-Donohue found the handheld computer enhanced clinical experiential learning. Students saved time, were able to look up information readily, and the technology had the potential to improve patient safety and quality of care (Koeniger-Donohue, 2008).

According to Altmann and Brady (2005), students used handheld computer programs such as a drug guide, a laboratory guide, and a medical reference text to access information while in the clinical area. Altmann and Brady point out students feel

anxious about medication administration, which is the greatest source of clinical errors. Farrell and Rose (2008) found that the majority of nursing students in their study thought handheld computers enhanced their knowledge regarding pharmacology and were a valuable learning tool for use in clinical, the classroom, and at home. Farrell and Rose investigated whether the use of PDAs enhanced nursing students' pharmacological knowledge during clinical practice. A quasi-experimental, non-equivalent experimental group design was used, as well as focus group discussions (Farrell & Rose, 2008). Seventy-six of the total 92 second-year students in the medical-surgical course of the baccalaureate program participated in the study (Farrell & Rose, 2008).

Handheld computers may be a means to support and enrich learning experiences of nursing students in clinical practice settings. However, technology cannot provide the only avenue through which nursing students learn to care for patients. Koeniger-Donohue (2008) expressed concern that dependency on handheld computers might be at the expense of development of critical thinking skills. The handheld computer cannot replace the need for an analysis of the patient nor should it be the only source of information when planning and implementing care (Tilghman, Raley, & Conway, 2006). Tilghman et al. (2006) reported on a pilot group of five family nurse practitioner students who used PDAs to organize data and access information relevant to patient care. The handheld computer "was not intended to replace the student's ability to use critical thinking in the management of patients" (Tilghman et al., 2006, p. 116). In addition, students need to learn caring skills in physical proximity with nurse educators, nurses, and patients: the lifeworld of nursing.

Technology alone does not automatically improve the learning process for students. Sit, Chung, Chow, and Wong, (2005) explored 198 students' views of an online learning initiative within a post-registration degree in nursing using a self-administered questionnaire. Sit et al. found that in order to be successful, the focus must be on teaching and learning, not merely the use of technology. The inadequate opportunity for human interaction which was deemed necessary for developing in-depth group discussion was a major hindrance (Sit et al., 2005). Innovations in technology should not detract from the educational quality of the programs they are being used to deliver (Howatson-Jones, 2004). The cost of technological devices and programs may prohibit their use; furthermore some students may dislike electronic devices (Altmann &

Brady, 2005). Miller et al. (2005) identified the significant cost of handheld computers and software as a risk in adopting handheld computers in undergraduate nursing education. Some have argued that technology risks diluting, rather than enhancing teaching and learning.

The use of technology in educational settings has expanded rapidly as technology has evolved. Kenny, Van Neste-Kenny, Park, Burton, and Meiers (2009) found the use of handheld computers is “feasible in actual nursing practice education settings” (p. 93). This study was a field trial of mobile learning in a practice course taught at the end of third year at a western Canadian community college (Kenny et al., 2009). Seventeen of the 22 students in the course volunteered for the study; 12 were assigned to the group who used mobile devices and 5 were assigned to the comparison group who did not use mobile devices (Kenny et al., 2009). This study collected several forms of evaluation data through pre and post-surveys, semi-structured interviews with six of the participants, and cell phone and data download statistics on faculty and mobile group device usage (Kenny et al., 2009). Kenny et al. (2009) found the devices were easy to learn and students were able to access resources at the point-of-care. However, Kenny et al. (2009) also found students encountered “hospital culture and policies that precluded the use of wireless devices in those settings” (p. 91). In a subsequent study, Kenny, Park, Van Neste-Kenny, Burton, and Qayyum (2012) used a cross-sectional survey design to assess the self-efficacy of nursing faculty and students related to their potential use of mobile technology and found nursing students were well prepared and motivated to engage in mobile learning and were using handheld computers regularly. Kenny et al. (2012) recommended that mobile devices be integrated into nursing program curricula.

Nursing education involves the development of a wide range of skills: core knowledge; the application of knowledge to clinical situations; reasoning and critical thinking; communication; and interpersonal skills (Lewis et al., 2005). It would be valuable to determine which of these skills are best learned through the use of technology. The key factor in making such assessments will be the educational merit of the learning rather than the technology. Technology that contributes positively to learning may also contribute to quality patient care.



Technology needs to be used judiciously in the educational environment. Adams' (2004) article discussed the pedagogical underpinnings of computer-based learning. Best use of the unique multimedia and communication features offered by technology are necessary to give added value to the traditional delivery of content (Adams, 2004). Justification for the inclusion of technology into courses must be based on sound pedagogical principles (Adams, 2004). Wu and Lai (2009) stated that the "handheld environment in a clinical nursing practicum was both technologically appropriate and pedagogically sound" (p. 203). Educators must ensure that effective teaching strategies are incorporated into learning rather than being driven by the technology (Adams, 2004). Using the most sophisticated methods might not necessarily be the best way to help students develop caring skills.

The relationship of emerging technologies with nursing education is not fully known and the benefits to nursing faculty of such devices as handheld computers can be difficult to recognize. Faculty are being asked to incorporate technology into clinical courses and to make decisions on computer requirements for students (Skiba, 2005). The introduction of handheld computers may mean additional work as part of an already demanding job and may add stress to an already-stressful work environment. On the other hand, nursing faculty may benefit from an opportunity to look at nursing education from a new perspective and learn about new and innovative ways to use handheld computers to provide a supportive learning environment for students. There may be increased job satisfaction for faculty, as well.

## **1.8. Rationale for the Study**

Can nursing students develop caring skills through the use of technology in the form of handheld computers? Both the caring relationship between the nurse and the patient, and the ability to utilize technology are important. Caring relationships and technology are both of value and indispensable to the role of the carer (Almerud et al., 2008). The way to value them equally is to understand how technology and caring fit with nursing (Almerud et al., 2008). The conflicting findings from previous research are the rationale for examining the relationship that handheld technology has with nursing students' ability to establish and maintain caring relationships. "Nurses are positioned at

an axis point between technology, individuals, clinical environments and communities and have a responsibility to take a primary role in interpreting and influencing the relationship(s) between technology, health care praxis and human experience” (Barnard, 2002, p. 20).

What is needed is a greater understanding of the use of this technology by nursing students and the relationship it has with their ability to establish and maintain caring relationships. Nursing is the amalgam of all of these parts; all of the parts are necessary and must be in balance for nursing to be effective. According to Almerud et al. (2008), “the flaw is not turning to the device *per se*; it is turning away from the person” (p. 60). The student who is excellent at the “science” of nursing but cannot display caring behaviors toward the patient may put too much emphasis on *techne* and too little on *telos*. The benefits of handheld technology for students and patients, and the relationship of technology with caring, are aspects of this convergence of technology and caring that need to be explored.

## **1.9. Conclusion**

Will the use of handheld computers result in an excessive focus on technology to the detriment of caring? This is a definite risk. Students need real-life examples, they need dialogical learning; they need the physical embodiment of nursing, and the experience of the intimacy of nursing. Can this dialogical relationship be adequately supported with handheld computers? Nursing must make use of new technology, while remembering the absolute necessity of the human touch, the human experience that must be part of the healing process. This human experience is required for caring, and the ethic of caring to be transmitted to the student.

The literature review, framework of the research methodology, analysis of the data, findings, and lessons learned will be discussed in the following chapters.

## **Chapter 2.**

### **Literature Review**

This chapter examines the concept of “caring” within the context of the nature of nursing. “Caring” is a central concept in nursing, and this literature review explored the subject by examining the concept of caring, and the characteristics through which caring can be recognized. The literature relating to the benefits and challenges posed by technology in health care were also examined.

#### **2.1. Caring Recognized**

Nursing is a caring profession. Caring is a core value of nursing and an essential component of nursing education, but there is no agreed upon definition of caring. The concepts of “caring” have been explored by many theorists. Tarlow has a dual background in psychiatric nursing and sociology (Mahoney, Tarlow, & Sandaire, 1998). Tarlow has had several academic appointments teaching psychiatric nursing and sociology, and her research interests include older peoples’ use of computer technology (Mahoney et al., 1998). Noddings taught elementary and high school math, and has a PhD in Education from Stanford (Inside the Academy, n.d.). Noddings is well known for her work related to the ethics of caring and her work has demonstrated the significance of caring, particularly within education (Smith, 2004). Watson is a distinguished professor of nursing and a nurse scholar who has made significant contributions to the development of the concept of caring in nursing (University of Colorado, 2012). Watson’s caring theory is examined through her own writing, and the writing of others such as Neil (2002), and Kelley and Johnson (2002). Benner is a nursing theorist whose research areas include ethics, nursing education, and caring (Spichiger, Wallhagen, & Benner, 2005). For this study, the work of these theorists guided the research questions (as outlined in Chapter 1), the development of the framework for how “caring” was

recognized (as outlined in Chapter 2), and the analysis of the concept of “caring” (as outlined in Chapter 4).

How can an observer recognize caring? Noddings (1984) suggests an observer can judge caring by confirming that: 1) the action of the one-caring brings about a favorable outcome for the cared-for; and 2) the one-caring acts in a variable, non-rule-bound way, rather than with behaviour conditioned by narrow and rigidly defined principles. Noddings’ first point is consistent with nursing as a goal of nursing care is a favorable health outcome for the patient. Nursing education may seem inconsistent with Noddings’ second point as students learn principles that guide their practice. Noddings views principles as narrow and rigidly defined; however, one could argue that the principles guiding nursing practice are not narrow and rigidly defined, but are necessary for the safe, competent provision of care for patients.

Noddings (1984) named the two participants of the caring relation as the “one-caring” and the “cared-for.” Noddings also associated the feminine “she” with the generic “one-caring” and the masculine “he” with the “cared-for,” while also recognizing that they both may be of either gender. Noddings’ ideas about caring both align and contrast with nursing practice. Noddings believes a caring attitude and the commitment to sustain it are universal, yet she largely rejects the notion of universality where principles provide guidance for caring. This idea is in contrast to nursing practice that is governed by standards, competencies and a code of ethics – i.e., principles that nurses are expected to follow in the provision of care. Noddings (1984) explains this idea further; caring is “to act not by fixed rule but by affection and regard” (p. 24). The one-caring acts with regard for the particular cared-for in a concrete situation. This notion aligns with nursing practice where a nurse provides care for a particular patient.

According to Watson (2006), caring is the essence of nursing and can only be effectively demonstrated and practiced interpersonally. Neil (2002) says that Watson’s concept of caring is “a moral ideal rather than a task-oriented behavior and includes such characteristics as the actual caring occasion and the transpersonal caring moment, phenomena that occur when an authentic caring relationship exists between the nurse and the patient” (p. 147).

According to Benner and Wrubel (1989), caring is primary because: 1) it sets up what matters to a person; 2) the condition of connection and concern is enabling; and 3) it sets up the possibility of giving and receiving help. Caring means that persons, events, projects, and things matter to people. Caring is specific, relational, and central to healing (Benner & Wrubel, 1989). A caring relationship establishes trust that enables the one cared-for to access the help offered, and to feel cared for (Benner & Wrubel, 1989).

### **2.1.1. *Caring Concepts***

Tarlow's (1996) study examined relationships of caring in different contexts to increase understanding about its unique and universal characteristics. Tarlow's eight caring concepts formed the basis of how caring was recognized in this study. She examined three sub-samples: families, schools and voluntary agencies. In her study, a caring relationship was viewed as valid if it was positive, satisfying, and valued as judged by the carer, the cared-for, the person who referred them to the research project, and the researcher (Tarlow, 1996). Tarlow (1996) developed eight caring concepts that "constituted overlapping phases of the caring process: time; be there; talking; sensitivity; acting in the best interest of the other; caring as feeling; caring as doing; and reciprocity" (p. 57). Two additional concepts are also discussed, including self-care of the carer and non-caring.

#### **Time**

Time was needed to do the work of caring. Time given was seen as evidence of the other's caring and a measure of the caring relationship (Tarlow, 1996). The time and presence of the person was required in order to be caring, but teachers and students accepted boundaries to caring and time in the school sub-sample (Tarlow, 1996). Caring usually happened during the school day and teachers were not expected to be available at all times in order to be considered caring (Tarlow, 1996). People had the ability, within limits, to adjust for pauses in caring and wait until the caring person was available (Tarlow, 1996). Time is an important concept in nursing practice, and handheld computers may save time that could be used to spend with the patient.

Watson (2006) discussed how the caring process is relational, connected, and transcends time, space, and physicality. McGarry, Aubeeluck, Simpson, and Williams' (2009) study explored the experiences of nursing students caring for older people. McGarry et al. used a qualitative research design and collected data using four focus groups held with nine second-year nursing students. Two initial focus groups and two follow-up focus groups were held over a two month period (McGarry et al., 2009). McGarry et al. found that students had clear caring values when entering the practice setting; however, those caring values were challenged by the scarcity of time to provide person-centred care. They recommended developing strategies to promote positive learning environments that enable students to retain caring values (McGarry et al., 2009). Rieman (1996) conducted a study with ten patients to explore the potential consequences of non-caring. Rieman pointed out that if nursing care was hurried, patients felt dehumanized, devalued, angry and fearful.

## **Be There**

Those doing caring work need to be present. Tarlow (1996) stated that to "be there" meant the caring person was present and prepared to help. Being there seemed to signal commitment, as it allowed people to be called upon to help. There was a feeling of an abundance of time for "being there" in successful caring relationships (Tarlow, 1996). To "be there" meant the carer was physically present, so this meant the caregiver was "accessible, approachable, [and] even welcoming for [those cared-for] to initiate a request for caring" (Tarlow, 1996, p. 61). A nurse being "present" with the patient is recognized as important to both patients and nurses.

Noddings concept of engrossment is similar to Tarlow's concept of "be there." Noddings (1984) explains engrossment of the one-caring happens when the one-caring listens to the cared-for and is present throughout the conversation. The one-caring is receptive to, or engrossed in, the cared-for (Noddings, 1984). Watson (2006) and Noddings also identified that the caring relationship calls for the one-caring to enter and stay within the other's frame of reference. This is similar to Tarlow's "be there" where the caring person is present and prepared to help.

According to Watson (2006) and Benner and Wrubel (1989), the caring relationship involves the ability to be present, or to be there with a patient. Caring

involves knowing, being with, doing for, enabling, and maintaining belief: “Caring is always related to issues of concern and significance” (Benner & Wrubel, 1989, p. 5). A study by Drumm and Chase (2010) examined the experiences of students learning caring behaviours, and it confirmed the value of the nurse being fully present with the patient.

## **Talking**

Talking is the mode used to define and implement caring activities (Tarlow, 1996). Talking is an important means of building and maintaining caring relationships, and an important piece of how caring happens (Tarlow, 1996). Communication needs to be honest, spontaneous, open, easy, and frequent. Talking is frequently intense, personal, and intimate in families and schools (Tarlow, 1996). Communication, including talking, is an important concept in nursing and is included as a foundational concept in nursing curricula. Benner and Gordon (1996) discussed caring as the ability to hear who the other is. Noddings (1984) saw dialogue as important in nurturing the ethical ideal of caring. Watson (2006) identified the importance of promotion and acceptance of expressing feelings, which includes talking.

## **Sensitivity**

Tarlow (1996) claims “People who [care] about each other [are] sensitive to each other’s needs” (p. 65). “Sensitivity,” however, is recognized as a complex concept, and a variety of factors are related to noticing the needs of others. A reservoir of experiences, and the more time people spend together, provides knowledge that enables people to be more readily sensitive to the needs of others (Tarlow, 1996). Sensitivity requires hard work and is not an innate ability (Tarlow, 1996). Noticing the needs of others is consistent with nursing practice. For example, students learn how to notice the needs of others and notice significant changes in patients’ health status through assessment of patients.

Tarlow’s (1996) concept of sensitivity has similarities to Noddings’ (1984) concept of engrossment. Noddings’ concept of engrossment is one of feeling and sensitivity. Noddings suggests that reception is not a matter of knowledge, but one of feeling and sensitivity. Watson (2006) identified the need for opening up to others with

sensitivity and compassion. Clearly, nurses need to be engaged with patients in order to be caring. The focus of the nurse needs to be on feeling and sensitivity toward the patient. Caring enables people to recognize problems, recognize which aspects of caring are relevant, and implement possible solutions (Benner & Wrubel, 1989), which is consistent with Tarlow's (1996) concept of sensitivity. Caring makes the nurse notice which interventions help, and notice subtle signs of improvement or deterioration in the patient (Benner & Wrubel, 1989).

### **Acting in the Best Interest of the Other**

Acting in the best interest of the other is a complex concept. According to Tarlow (1996), "those caring wanted to understand what needed to be done in the present in order to achieve some desired end that would assure the future well-being or happiness of the person cared about" (p. 69). There was a presumption of benevolence when acting in the best interest of the other. This concept is evident in nursing practice where nurses are expected to adhere to a code of ethics, and engage in ethical practice. Nurses are concerned about doing what is deemed best for the patient.

The nurse's moral commitment is to protect, enhance, promote, and potentiate human dignity, wholeness, and healing (Watson, 2006). Watson (2006) commented that caring is a moral ideal, rather than a task-oriented behavior. According to Benner and Gordon (1996), the central issue is not whether the best is wished for the patient, but whether the set of practices that are required when there is a need for someone to be cared for can be created.

Noddings (1984) says that the one-caring and the cared-for always approach the other as though the other has a respectable motive. Dialogue, practice, and attribution of the best possible motive are all essential in nurturing the ethical ideal (Noddings, 1984). The one who is cared-for has an obligation to attribute caring motives to the one-caring. The one-caring does not look for ulterior motives and interprets the words and acts of the cared-for in the best possible light.

The caring attitude that is perceived by the cared-for is generated by the inclusion and confirmation efforts of the one-caring (Noddings, 1984). This attitude both accepts and confirms; it embraces, it leads upward, it questions, it responds, it



sympathizes, it challenges, and it delights (Noddings, 1984). Achieving inclusion is part of what makes nursing successful. Inclusion allows the patients to have their needs met without considering their significance for the personal development of the nurse.

Noddings (1984) claims the “essential elements of caring are located in the relation between the one-caring and the cared-for” (p. 9). In order for the one-caring and the cared-for to have a caring relation, both must contribute appropriately (Noddings, 1984). The one-caring acts to protect, enhance, and promote the well-being of the cared-for, so the happiness and pleasure of the cared-for is enhanced (Noddings, 1984). Noddings goes on to say that the caring attitude of the one-caring warms and comforts the cared-for, and that caring requires the one-caring to step into the frame of reference of the other person, to consider the other’s point of view with the attention or engrossment on the cared-for. This requirement is consistent with the nursing competency that requires the nurse to engage in relational practice with the patient (CNO, 2008).

## **Feeling**

Caring is considered a feeling and an activity (Tarlow, 1996). Feelings of concern and/or affection about the person were tied to why people cared (Tarlow, 1996). Caring as a feeling was most prevalent in Tarlow’s family sub-group, although some teachers in the school sub-group talked about caring as a feeling related to their motivation to teach (Tarlow, 1996). This concept is consistent with nursing as many nurses describe caring for patients as a feeling. Watson (2006) identified the importance of expressing both positive and negative feelings. Caring relations are guided by feeling (Benner & Gordon, 1996).

Tarlow’s (1996) concept of feeling is similar to Noddings’ (1984) concept of engrossment. According to Noddings, “caring for” involves a “feeling with the other” for the one-caring. This “feeling with” involves reception or engrossment (Noddings, 1984). The aim is for the one-caring to receive the other into herself, while seeing and feeling with the other person (Noddings, 1984). This engrossment, Noddings continues, is not the one-caring putting herself in the other’s shoes, but seeing as though the eyes of the one-caring have combined with the eyes of the other to look at the scene he describes.

The one-caring can feel what the cared-for says he feels, and does not analyze his reality as objective data (Noddings, 1984).

### **Doing for Others**

Caring as “doing things for others” was the dominant concept identified (Tarlow, 1996). Although what was done varied, “the essence of caring was benevolent activity in behalf of another” (Tarlow, 1996, p. 73). The knowledge of a unique other was required for the initiation of caring. Doing things involved thinking about, negotiating, and carrying out what was deemed best for the other, as well as trusting the motivation of the other (Tarlow, 1996). Caring enables recognition of a problem, and identification and implementation of solutions (Benner & Wrubel, 1989). Instrumental thinking can help to determine what to do once the one-caring has committed to doing something (Noddings, 1984). An observer can judge caring by determining whether the action of the one-caring brings about a favorable outcome for the cared-for (Noddings, 1984). This concept is consistent with nursing practice as nurses are often involved in “doing for others,” such as assisting patients with activities of daily living.

According to Benner and Wrubel (1989) caring practices are always bound up in knowing and doing and cannot be separated. Without a set of caregiving skills and practices the person cannot be a caregiver (Benner & Gordon, 1996). However, Benner and Wrubel warn that nursing is more than simple techniques. An act done in a non-caring way may have very different consequences from the same act performed in a caring way. Detached unemotional reasoning alone cannot provide the ground for the development of expertise. In caring relationships the ability to move back and forth between instrumental thinking and feeling must be retained (Noddings, 1984). In addition, expertise does not develop well with an overabundance of emotion. There needs to be a balance of reasoning and emotion.

Noddings (1984) explains that engrossment pushes the one-caring to acquire skills. There is a dimension of competence in caring, which requires practice in caretaking skills. This is similar to Tarlow’s (1996) concept of doing for others. Noddings states that the acquisition of caring skills is theoretically derived and instrumental to its actualization; therefore, a relationship is required to nurture the ethical ideal. One must have actual encounters with others and legitimate opportunities to care

in order to care effectively. This notion is in alignment with nursing education. Theoretical caring concepts and skills are not only learned in the classroom and lab settings. Students also learn caring skills through direct care for patients in clinical settings.

## **Reciprocity**

Reciprocal relations are essential for caring relationships, and this concept of caring is one of the most comprehensive of the concepts (Tarlow, 1996). Although reciprocity usually involves an unequal interchange that varies enormously in content, there is a mutual sense of obligation and responsibility (Tarlow, 1996). Unlike the other concepts, research participants in Tarlow's study provided many examples of what was not reciprocity (Tarlow, 1996). It seems when reciprocity fails, it interferes with caring relationships. Other authors described caring relations as fragile, but Tarlow (1996) concluded that caring relationships are resilient and able to tolerate some lapses in caring. Caring is ongoing and mutual. Tarlow (1996) stated "[t]he efforts of the caring person must be perceived and interpreted as valued by the person cared for" (p. 80). This concept may sometimes be challenging to perceive in nursing practice, particularly when patients have difficulty actively participating in reciprocal relationships due to their developmental abilities, cognitive abilities, or health status.

Noddings (1984) describes reciprocity as the contribution of the one cared-for to the caring relation. If the cared-for does not recognize the caring, the relationship cannot be characterized as one of caring (Noddings, 1984). For example, the nurse cannot solely be credited or blamed in the caring relation. This lack of successful completion of the caring relationship does not necessarily signify negligence. There are limits to caring, and there may be no way for caring to reach the cared-for (Noddings, 1984). Reciprocity may be difficult for the nurse to perceive, particularly when patients are non-verbal, or have cognitive impairments.

The reception of caring becomes part of what the one-caring feels when she receives the cared-for (Noddings, 1984). A fully participating cared-for who gives genuine reciprocity to the relation sustains and invigorates the one-caring (Noddings, 1984). Caring is completed when it is fulfilled by both the one-caring and the cared-for (Noddings, 1984). Some patients, through their trust, openness, and capacity to receive

and extend the care they are given, participate in caring relationships that become transformative (Benner & Gordon, 1996). For example, sharing on the part of the patient enables the nurse to care more easily.

Watson (2006) states, “a caring moment involves an action and choice by both the nurse and other” (p. 300). The nurse and the other choose how they want to be in the relationship. In the transpersonal relationship, the nurse and the other each feel a connection at the level of the spirit, and new possibilities for healing are opened (Watson, 2006). The caring moment is affected by the nurse’s consciousness. Watson (2006) identifies this consciousness as “caring-healing-loving consciousness” (p. 300). There is an interconnection between the one-caring and the one cared-for, and there is a connection to other humans and the energy of the universe. The process is relational and connected, and transcends time, space, and physicality (Watson, 2006). A caring-healing practice environment depends on authentic relationships and partnerships, an intentionality focused towards caring, healing, and spiritualization of health (Watson, 2006).

Accepting the gift of reciprocity from the cared-for is natural for the one-caring (Noddings, 1984). However, to demand such responsiveness is futile and inconsistent with caring (Noddings, 1984). If the cared-for does not respond, if the demands of the cared-for become too great, or if the responses of the cared-for are delivered ungraciously, the one-caring may become resentful and may withdraw her caring (Noddings, 1984). This is a risk in nursing, as patients may not always respond, or may not respond in a positive way, to the caring efforts of the nurse.

## **Self-care**

According to Watson’s concept of caring factors, self-care is a prerequisite to being able to care for others (Neil, 2002). At the expense of their own health, nursing students often do not care for themselves when learning to care for patients (Stark, Manning-Walsh, & Vliem, 2005). Stark et al. examined the effect of a self-care intervention on 67 undergraduate nursing students who had completed a course requiring self-care using a pretest/post-test, single group design. Stark et al. point out that nurses who care for themselves will have the personal resources to care for patients. Noddings (1984) describes the ethic of caring as a tough ethic that advocates

a deep and steady caring for self. The self and other are not separated in caring. To sacrifice bitterly and grudgingly is not to be one-caring (Noddings, 1984). The one-caring must be strong, courageous and capable of joy (Noddings, 1984). The focus on self-care for the one-caring is important to nursing, as caregiver burnout is a concern for many nurses.

## **Non-caring**

In a study by Rieman (1986), non-caring was described by patients as the situation where the nurse was not present, but only there to get the job done. If nursing care was hurried, patients felt dehumanized, devalued, angry and fearful (Rieman, 1986). The one-caring may become non-caring if the focus remains on instrumental thinking or problem solving (Noddings, 1984).

When something matters to a person, for example a nurse, caring puts that person at risk for vulnerability that can lead to the creation of “controlled caring.” In controlled caring, the one-caring dictates what matters, can distance themselves, and stop caring if they are threatened (Benner & Wrubel, 1989). While distancing can be useful for nurses to gain perspective and respite, the meanings inherent in caring are lost and suffering is trivialized if this detachment becomes a preferred method of coping for nurses.

When an attitude of inclusion is not present, the person who is the focus of the caretaking feels the lack of caring (Noddings, 1984). To be treated as a type instead of an individual objectifies the person. The person becomes a case instead of an individual. People are often reduced to being cases by the institutions that have been established to provide care (Noddings, 1984). When institutions or agencies provide caretaking, caring becomes removed from the relation between the one-caring and the cared-for, and caring is transformed into abstract problem-solving (Noddings, 1984). Noddings (1984) says the focus is shifted from the cared-for to the problem. This is an important challenge in nursing, as care for the patient is provided in the context of institutions and agencies. Care can become centred on the institutions’ needs, rather than the needs of the patient.

## **2.2. The Nature of Nursing**

The nature of nursing is complex and difficult to describe. Evidence to support nursing practice comes from a wide range of sources: formal research, expert opinion, experience, tacit knowledge, intuition, and communications with colleagues (Gosling, et al., 2003). Evidence-informed nursing practice involves integrating individual expertise with the best external evidence available from systematic research. Examination of concepts, such as “caring” and “the ethics of care,” provides a foundation for examining the relationship between theoretical knowledge, knowledge obtained by experience, and the good of the patient. For the purposes of this study, an understanding of the nature of nursing provides context for exploring the use of handheld computers in nursing education. Understanding the nature of nursing also provides context to determine whether handheld computers are able to support nursing students’ understanding of “caring” as a central virtue of nursing.

### **2.2.1. *The Concept of Practice Applied to Nursing***

MacIntyre is a philosopher who bases his ideas on Aristotle and the Judeo-Christian tradition (Holmes, 1992). His notion of “practice” in relation to teleological virtue (Sweeden, n.d.) is of particular interest. According to MacIntyre (1984) a “practice” is:

any coherent and complex form of socially established cooperative human activity through which goods internal to that form of activity are realized in the course of trying to achieve those standards of excellence which are appropriate to, and partially derivative of that form of activity, with the result that human powers to achieve excellence, and human conceptions of the ends and goods involved, are systematically extended.  
(p. 187)

Nursing is consistent with MacIntyre’s concept of a practice. Nursing practice is complex and is implemented through the cooperative activity of patients in collaboration with nurses and other members of the health-care team. “There is a pressing need for nurses to work with others (i.e., other nurses, other health-care professionals, and the public) to create the moral communities that enable the provision of safe, compassionate, competent and ethical care” (CNA, 2008, p. 5). As well, nursing

practice has a focus on the achievement of goods for humankind. For example, human conceptions of the ends and goods involved are systematically extended by nursing practice through maintaining a code of ethics (CRNBC, 2008a) when providing care for patients.

MacIntyre (1984) comments that a practice involves standards of excellence and practitioners are expected to comply with rules. To practice nursing, a person needs to accept the authority of the professional standards of nursing, competencies, and code of ethics, and be willing to have the adequacy of his or her own performance be judged against those requirements. For example, professional standards provide a framework for the practice of nursing and set out levels of performance that nurses are required to achieve (CRNBC, 2012a). Practice standards are requirements related to specific aspects of nursing practice such as the duty to provide care, privacy and confidentiality, and consent (CRNBC, 2012a).

### **Goods Internal to Nursing Practice**

To apply MacIntyre's (1984) framework, goods internal to nursing are those goods that cannot be had in any other way than through the practice of nursing, and can only be identified and recognized by the experience of participating in nursing. An example of goods internal is the excellence of the product of nursing, in terms of the performance of nursing and the health outcome of the patient. The nurse responds creatively to problems through the practice of excellence in nursing. For example, nurses promote health and well-being by working with people to enable them to attain their highest possible level of health (CNA, 2008). When a patient is dying, nurses foster comfort, alleviate suffering, and support a peaceful death (CNA, 2008). Benner, Sutphen, Leonard-kahn, and Day (2008) examined the Carnegie Foundation National Study of Nursing Education report. Benner et al. (2008) interpreted the small-group interviews of nursing students and concluded: "everyday ethical concerns of senior nursing students capture major notions of goods internal to nursing practice" (p. 476). These ethical concerns included: meeting the patient as a person rather than a diagnosis, being present with patients and families, and working to relieve their suffering (Benner et al., 2008). The findings of Benner et al. are consistent with the code of ethics for registered nurses (CNA, 2008).

Achievement of goods internal is for the good of the community that participates in the practice (MacIntyre, 1984). Nursing service to the public cannot be achieved in any other way than through nursing practice. As patients are active participants in nursing care, this notion of goods internal is consistent with the premise of nursing practice as being in the service of the public. For example:

There are broad aspects of social justice that are associated with health and well-being and that ethical nursing practice addresses. These aspects relate to the need for change in systems and societal structures in order to create greater equity for all. (CNA, 2008, p. 20)

Nurses individually and collectively advocate for and work toward addressing social inequities through endeavors such as: advocating for policies and programs that address the social determinants of health, working to improve the quality of lives for people who are disadvantaged, taking action to overcome barriers to health care, and advocating for equitable access to a range of health-care choices (CNA 2008).

### **Virtues in Relation to Nursing Practice**

A virtue is a quality the exercise of which leads to the achievement of the human *telos*, the good of humankind (MacIntyre, 1984). According to MacIntyre (1984), “a virtue is an acquired human quality the possession and exercise of which tends to enable us to achieve those goods which are internal to practices and the lack of which effectively prevents us from achieving any such goods” (p. 191). For example, exercising the virtue of caring allows nurses to achieve *telos*, the good of humankind such as service of the public through the practice of nursing.

Virtues are those qualities by reference to which we define our relationships to those people with whom we share the kind of purposes and standards that inform practices (MacIntyre, 1984). The “Standards for Registered Nursing Practice in British Columbia” include statements about nursing values and responsibilities (CRNBC, 2008a). For example, nurses act to promote the provision of safe, appropriate, and ethical care for patients (CRNBC, 2012a). By sharing the standards and purposes of nursing, nurses define their relationship to one another.



MacIntyre (1984) explains that according to Aristotle, virtues attach to the person not the role the person fulfills. Therefore, the virtue of caring would attach to the person who is caring for the patient, rather than the role of the nurse. A person does not need to be a nurse to be caring; however, caring is a requirement of ethical nursing practice. According to the practice standard *Duty to Provide Care* “nurses have both a professional and legal obligation to provide their clients with safe, competent and ethical care” (CRNBC, 2012b, p. 1). In addition, the seven primary values of the CNA Code of Ethics for Registered Nurses (2008) include “promoting safe, compassionate, competent and ethical care” (p. 3). The code of ethics for registered nurses (CNA, 2008) defines compassionate as:

The ability to convey in speech and body language the hope and intent to relieve the suffering of another. Compassion must coexist with competence. Compassion is a relational process that involves noticing another person’s pain, experiencing an emotional reaction to his or her pain, and acting in some way to help ease or alleviate the pain. (p. 23)

Aristotle treats the acquisition and exercise of virtues as means to an end (MacIntyre, 1984). In other words, ideally the nurse exercises the virtue of caring in order to achieve the end of goods for the patient, such as a positive health outcome or a peaceful death. MacIntyre (1984) sees this means-to-an-end relationship as internal and not external (i.e., a means internal to a given end, when the end cannot be adequately characterized independently of a characterization of the means). In addition, the exercise of virtues is itself a crucial component of the good life (MacIntyre, 1984). The nurse discovers through the practice of nursing the good of a particular type of life, which is defined by upholding the core ethical responsibilities expected of nurses (CNA, 2008).

According to MacIntyre (1984) there are different and incompatible conceptions of virtue and these result in a lack of agreement regarding the concept. The profession of nursing has a similar challenge. Nursing is a profession with diversity in the people practicing as nurses, the settings where nursing occurs, and the patients who are active participants in nursing practice. There are four diverse practice areas of nursing – education, research, administration, and clinical practice. Within each of these four areas of nursing there is even more diversity. For example, clinical practice differs

depending on whether it takes place in acute-care or community settings. As well as the diversity within the profession of nursing, there is also diversity among the individual nurses and patients who receive nursing care. Nurses and patients differ in terms of age, gender, ethnicity, religion, and beliefs regarding health care, to name a few. This diversity further complicates the understanding of caring and the practice of nursing. With this diversity, it is a challenge for nurses to come to any agreement about the virtues of nursing; however, this notion of virtue is consistent with the central tenet of nursing, which is to be of service to the public (CRNBC, 2012a). The mission of nursing is to provide safe and appropriate nursing practice in the public interest (CRNBC, 2008a).

### **Caring, a Central Virtue of Nursing Practice**

Spichiger et al. (2005) wrote about nursing as a caring practice from a phenomenological perspective. According to Spichiger et al., nursing is described as a caring profession; however, there is no agreed upon definition of caring, and measurement of caring remains controversial. Drumm and Chase (2010) explain that much literature from the 1980s and 1990s supported caring as a core value of nursing. Cook and Cullen (2003) described caring as the essential component of nursing and nursing education in their article regarding caring as an imperative for nursing education. According to Spichiger et al. (2005):

A caring practice requires phronesis and cannot be adequately described as definite behaviours, actions, sentiments, outcomes and so forth. Rather, what is perceived as a caring practice depends on the concerns that define the person's self and work and the caring practices required to restore the person and/or his or her lifeworld. (p. 308).

Phronesis or clinical reasoning “includes the heart and the mind, the particular and the universal, interpretation, and contextualization” (Benner, 2011, p. 346). Therefore, this study examines the concept of caring from the perspective of patients and students. While there is lack of agreement about what caring is, nurses can agree that the virtue of caring is a necessary component of nursing practice, along with internal goods and standards of excellence.

## **Caring Practice**

Caring practices refer to the activities people get involved in because other people matter to them (Spichiger et al., 2005). Caring practices encompass the particular, as well as the general, and include contextual and relational knowledge, as well as rule-governed abstract principles (Benner & Wrubel, 1989). Benner and Wrubel (1989) state, “nursing is viewed as a caring practice whose science is guided by the moral art and ethics of care and responsibility” (p. xi). The perspective of nursing is based on the “notion of good inherent in the practice and the knowledge embedded in the expert practice of nursing” (Benner & Wrubel, 1989, p. xi). Benner and Wrubel believe that knowledge is extended and developed in practice. Understanding what illness means to a patient is important and can be therapeutic, even when there are no instrumental interventions to be done. “The ability to presence oneself, to be with a patient in a way that acknowledges your shared humanity, is the base of much nursing as a caring practice” (Benner & Wrubel, 1989, p. 13). Caring is a starting point for understanding which helping strategies actually help.

Benner and Gordon (1996) “make a distinction between a generalized feeling of benevolence for others or one particular other, and a special set of skills, reflections and activities that allow one to be with and do for another” (p. 41). From their perspective, “to care about” is a generalized sentiment of concern that is easily mistaken for a set of practices and skills that allow care providers to consistently connect with, be with, and care for their patients (Benner & Gordon, 1996). A person can care about someone in need of caring, but without a set of caregiving skills and practices the person cannot join in being a caregiver (Benner & Gordon, 1996). The central issue is not whether the best is wished for the patient, but whether the set of practices can be created that is required when there is a need for someone to be cared for.

Caring requires connection and involvement, as well as caregiving knowledge and skills (Benner & Gordon, 1996). Practice must be carried out in evolving, living relationships guided by feelings, and attitudes that give meaning to interactions. Some patients, through their trust, openness, and capacity to receive and extend the care they are given, participate in caring relationships that become transformative (Benner &

Gordon, 1996). The people involved determine the outcome of the caregiving relationship.

Practice is always socially situated and must relate to the particular person and situation, and trust is needed between care providers and patients (Benner & Gordon, 1996). A nurse's practice must be innovative and skilled, and the nurse must have a memory of past situations in order to respond to the particular person. Benner and Gordon (1996) point out that, at times, the outcome is not the point. The encounter is what is important: the ability to be with, and to hear who the other is. The decision to "be with" rather than "do for" is an integral part of caring practice (Benner and Gordon, 1996).

Watson's theory provides a moral and philosophical basis for nursing and the carative factors provide guidelines for nurse-patient interactions (Neil, 2002). Caring theory is part of many baccalaureate nursing curricula and is viewed by many nurse educators as helping nurses develop philosophical and moral bases for their practice (Neil, 2002). Some nurses may have concerns about the focus on the "being" rather than the "doing" aspects of nursing. The focus on psychosocial versus physiological aspects of caring and the lack of concrete guidelines for how to achieve caring-healing relations may also pose some difficulties in implementing Watson's caring theory (Neil, 2002). Kelley and Johnson (2002) point out that Watson does not exclude the needs of the physical body, but rather she views the body as residing in a field of consciousness, as being embedded in the soul.

## **2.3. Instrumental Reason and Technology**

### **2.3.1. *Taylor and Instrumental Reason***

Taylor is a Canadian philosopher whose research areas include moral philosophy and the culture of Western modernity (McGill University, 2013). Taylor's articulation of practical socially embedded knowledge uncovers tensions and conflicts within nursing (Benner, 2011). Taylor (2004) views modernity as an amalgam of new practices and institutional forms, such as technology. Use of handheld computers is a recent practice in the education of nurses, and is, therefore, an example of this notion of

modernity. Taylor (2004) describes “instrumental rationality” as one of these new ways of living. Along with these new ways of living, Taylor (1991) also describes new forms of malaise: loss of meaning, an eclipse of ends in the face of rampant instrumental reason, and loss of freedom. While all three of these forms of malaise can be associated with the use of handheld computers in nursing education, discussion will focus on instrumental reason.

The primacy of instrumental reason is evident in the prestige and aura that surrounds technology (Taylor, 1991). This prestige makes nurses believe they should seek technological solutions even when something else, such as caring, is called for. The primacy of instrumental reason can lead to a fear that things that ought to be determined by other criteria will be determined by cost-benefit analyses relating to such metrics as risk assessments, maximum efficiency, or the best cost-output ratio thereby putting dollar assessments on people’s lives (Taylor, 1991). This notion can be applied to nursing care that should be determined by what is in the best interests of the patient, rather than what is most efficient and cost effective.

### **2.3.2. *Noddings and Instrumental Thinking***

According to Noddings (1984) the rational powers of the one-caring can be enrolled in the service of the engrossment in the other. The one-caring cannot always remain in the receptive mode; she must respond, make plans, and execute them. Instrumental thinking may enhance caring and can help to determine what to do, once the one-caring has committed to doing something (Noddings, 1984). As the one-caring converts what was received from the other into a problem or something to be solved, the one-caring moves away from the cared-for (Noddings, 1984). The other’s reality becomes data to be analysed, studied, and interpreted, which is appropriate provided the one-caring moves from the analysis back to the concrete and personal (Noddings, 1984). This move to instrumental thinking and problem solving is consistent with the nursing process. Nurses move from assessment, to planning, intervention, and evaluation in the process of caring for the patient.

However, in caring, an untimely move from feeling and affective engrossment to abstract problem solving would be a movement from the appropriate to something

qualitatively different and less appropriate (Noddings, 1984). Objective thinking must remain tied to a relational stake at the heart of caring (Noddings, 1984). Noddings (1984) says that if the one-caring does not move away from instrumental thinking, the one-caring will now care about a problem rather than a person. What seems to be crucial is that the ability to move back and forth between instrumental thinking and feeling is retained. If the focus of the nurse remains on instrumental thinking or problem-solving, in other words, the nurse may become unfeeling and unseeing. While the nurse must implement interventions to care for the patient, completion of tasks must not be the singular focus of the nurse.

### **2.3.3. *Sublimation of Caring by Technology***

Some people look at the coming of technological civilization as a kind of unmitigated decline. They may believe that contact with ourselves and our own natural being has been lost, and that we are driven by an imperative of domination that condemns us to ceaseless battle against nature (Seibert, Guthrie, & Adamo, 2004). Real-world interaction, such as nursing, involves “hands-on” practice and technology may interfere with that contact. Such technological opponents might ask: Why invest valuable resources in the use of handheld computers if their value to patients is yet to be demonstrated, and may be detrimental to the well-being of patients?

According to Cook and Cullen (2003), demonstration of caring is the exception in a technological health-care system. Benner (1994) argues that the technological approach in health care has often sidelined the kind of care that involves treating the patient as a whole person with a life-story, and not a locus of a technical problem. Society often undervalues the contribution of nurses, who, more often than not, provide this humanly sensitive caring, rather than that provided by specialists with high-tech knowledge (Benner, 1994). Caring is more difficult when the “value of caring is hidden by the powerful claims of efficiency and the efficacy of skillful technical interventions in health care institutions, especially interventions that can be counted and paid for directly” (Benner, 2011, p. 344).

Neil (2002) explains that Watson’s theory of caring, the caring foundation of nursing has been sublimated by technological advancements. Neil identifies that the

increased reliance on complex technology has been identified as possibly interfering with the use of the caring theory. According to Watson, research needs to identify conditions that promote caring when humanity is threatened by a highly technological society, and research conditions need to foster the view of the person as an end, not a means (Neil, 2002). In their article examining philosophical approaches to a nursing informatics framework, Matney, Brewster, Sward, Cloyes, and Staggers (2011) explain that “modern scientific rationality and technology have systematically forgotten phronesis in favour of exclusive promotion of techne - that is the idea of applying skills as the most efficient way to solve problems” (p. 14). These are examples of what Taylor describes as a new form of malaise; an eclipse of the ends as a result of rampant instrumental reason.

#### **2.3.4. *Value of Technology in Health Care***

Other people are supporters of technology and think it provides a fix for all our human problems. These people tend to be impatient with those who stand in the way of development. According to Feeg’s (2004) viewpoint, information technology in our health-care system will provide a quantum leap in patient power, doctor power, and effective health-care. Wyatt et al. (2010) conducted education action and survey research with 22 nurse practitioner students. Wyatt et al.’s study reinforced that handheld computers are useful reference tools in clinical practice. Handheld computers “support nurses and nursing students in their practice, particularly in accessing drug and medical information, supporting clinical decision-making, and enhancing learning” (Johansson et al., 2011, p. 856).

Hudson and Buell (2011) conducted a study with baccalaureate nursing students using PDAs throughout their education to assess the characteristics of PDA uptake and use in both clinical and classroom work. The initial sample size of 105 students completed structured and open-ended survey questions at the beginning of the program, 94 students completed surveys at the end of the first semester, and 75 students completed surveys at the end of the program two years later (Hudson & Buell, 2011). Hudson and Buell state that handheld technology is desirable because it provides current information rapidly. They also point out the convenience of this technology “may

increase the timing, safety, and quality of care that can be provided for a diverse range of patients” (Hudson & Buell, 2011, p. 405).

Koeniger-Donohue (2008) found handheld computers enhanced experiential learning. Brubaker, Ruthman, and Walloch (2009) conducted a qualitative descriptive pilot study of seven senior nursing students enrolled in a semester long clinical rotation to explore the nursing students’ perceptions of the usefulness of PDAs in the clinical setting. Brubaker et al. report that handheld computers help students to connect theory to practice. Students in Brubaker et al.’s study said handheld computers provided information that was timelier than their textbooks.

Moloney and Becarria (2009) conducted a qualitative systematic review with meta-synthesis of 11 qualitative studies to determine the best evidence available regarding the experiences of nurses related to usability, applicability, and functionality of PDAs in clinical practice. According to Moloney and Becarria (2009) handheld computer technology gives “real-time access to evidence-based practice materials and resources to aid decision-making” (p. 965). Altman and Brady (2005) found handheld computers were useful by reducing medication errors. This aura and prestige that surrounds technology such as handheld computers are examples of the primacy of instrumental reason as described by Taylor (1991).

### **2.3.5. *Ethic of Caring***

According to Noddings (1984), “the ethic of caring locates morality primarily in the pre-act consciousness of the one-caring” (p. 28). She claims, “The longing for goodness provides what universality there is in what it means to be moral” (p. 27). People behave morally because they are, or want to be, moral human beings. People’s interest in moral behaviour arises out of their natural impulse to care. The fundamental strength of the caring ethic is that it is not simply a matter of principle that compels us to assist one who cries out for help; it is an attitude that pervades life and establishes the human bonds upon which we depend (Noddings, 1984).

Ethical caring depends on the development of an ideal self, formulated in congruence with one’s best remembrance of caring and being cared for, rather than



upon rules or principles (Noddings, 1984). Moral statements are not derived from facts or principles, but from the caring attitude. This is in contrast to nursing because nurses are required to comply with the principles of a code of ethics (CRNBC, 2012b). Nursing competencies also guide the nurse to provide the patient with a caring environment. One could argue that these principles guiding nursing are broad and not proscriptive in the particular, therefore, would not interfere with ethical care.

When the one-caring is in conflict, the ethical responsibility of the one-caring is to reflect on how well she is meeting her ideal (Noddings, 1984). Thinking guided by caring seeks a way to continue to be one-caring and to enhance the ethical ideal. While traditional values are often conserved in the ethic of caring, the locus of ultimate decisions concerning right and wrong is in the internal dialogue of the one-caring (Noddings, 1984). As self-deception has the potential to destroy the ethical ideal, the one-caring must look clearly and reflectively on what is inside as she relates to others (Noddings, 1984). Nurses are encouraged to reflect on their practice particularly when conflict arises (CRNBC, 2012b; CNA, 2008).

### **2.3.6. *Technology Framed by an Ethic of Caring***

Taylor (1991) believes that both stances in relation to technology are more or less equally wrong: that the coming of a technological civilization is an unmitigated decline versus the prestige of technology such as handheld computers. In a large and complex technological society, common affairs must be managed to some degree according to the principles of bureaucratic rationality (Taylor, 1991). Certainly, many of those receiving nursing care rely on the bureaucratic structure of the hospital as one example. Modern society tends to push us in the direction of instrumentalism, in part by generating an outlook that takes these principles of rationality for granted as standards. Part of what supports instrumental reason is that it enables us to control our environment (Taylor, 1991). Coming to understand the moral sources of our civilization can make a difference, as it can contribute to a new common understanding (Taylor, 1991). We can struggle against instrumentalism by retrieving some of the moral background from which instrumental reason arose.

According to Taylor (1991), if the reason why technology is important is understood, then it will be limited and enframed by the ethic of caring. Instead of seeing technology purely in the context of an enterprise of ever-increasing control, it can be seen in the moral form of the ethic of practical benevolence, which is also one of the sources in our culture from which instrumental reason has acquired its salient importance for us (Taylor, 1991). Instead of seeing our predicament as fated to generate a drive for ever-increasing technological control, we can begin to understand it as open to contestation, as a locus of continuing struggle (Taylor, 1991). Barnard (2002) suggests the relations between nursing and technology need to be examined from humanities-based perspectives, as well as from an instrumental action perspective. Therefore, this study examines the use of technology in the form of handheld computers in the context of an ethic of caring.

## **2.4. Gap in the Literature**

The examination of the literature regarding caring and technology reveals a gap in the literature. There were no studies found that examined the use of handheld computers in the context of caring practices. “There is little to no research-based evidence to suggest how interpersonal relationships may change, although anecdotal experience suggests that the use of point-of-care devices and electronic communications do change the nature of interactions” (Registered Nurses Association of Ontario, 2012, p. 72). This study is a beginning step in addressing this gap in the literature and provides another rationale for this study.

## **2.5. Conclusion**

The nature of nursing was explored through an examination of the concepts of “practice,” goods internal to the practice of nursing, and the virtue of caring. Instrumental reason in relation to technology and the impact of instrumental reason on nursing practice were also discussed. The literature identified the risk that care can be eroded in environments that emphasize technology. There is a gap in the literature regarding the use of handheld computers in the context of caring practices.

The examination of the literature on caring revealed a variety of notions about caring, the ethics of care, and caring in nursing. The perspectives of Noddings, Watson, Tarlow, and Benner and others provided enlightenment about many of the facets of these complex concepts. While the authors' discussion differed in many respects, there were also several points of agreement. Care occurs in a relationship, is a moral ideal, requires the nurse to "be there" for the patient, requires the development of caring skills, and often involves one doing for another.

## **Chapter 3.**

### **Methodology**

This chapter provides a description of the importance of the research questions, the qualitative case study approach, the sampling strategies, the data sources, and the data collection. The protection of human rights, the role of the researcher, and site relations are described as well.

#### **3.1. Purpose of Research**

New nursing graduates are expected to understand and utilize technology, as well as provide the patient with a caring environment through relational practice (CNO, 2008). Technology and the expression of caring in nursing can be viewed as dichotomous concepts (Locsin, 2001). Cornelius (2005) found that while handheld technology effectively developed clinical competency in nursing students, technology could be a barrier to the nurse-patient interaction. The benefits and challenges of handheld technology for students and patients, and the effect of technology on caring in nursing and nursing education, are not clear and need to be explored. The purpose of this case study was to examine the relationship that handheld technology had with the ability of nursing students to establish and maintain caring relationships with patients.

#### **3.2. Research Approach**

A qualitative research approach, specifically the case study approach, was chosen for this investigation for two reasons. First, the research took place on a nursing unit of a local hospital, and a qualitative approach is appropriate for research that takes place in the “real-life” context (Creswell, 2003). Second, examination of caring theory

does not lend itself to traditional empirical scientific methodologies but rather to qualitative research approaches (Neil, 2002). Caring theories were used in this study to frame the issue of technology in nursing education and guide the research questions.

### **3.3. Case Study Method**

#### **3.3.1. *Appropriateness of the Case Study Method***

The case study research method was used in this study. According to Creswell (1998), case study research has a distinguished history across many disciplines. The case study approach is probably the most widely used approach in qualitative education research (Gall et al., 2007). According to Yin (1993) a case study is an appropriate research method for a broadly defined topic, when the context in which the case is studied is bounded, and when the study needs multiple sources of data to capture the richness of the case. The case study presented here fits all of these criteria.

The case study research approach is the in-depth study of a phenomenon in its real-life context, and reflects the perspective of the participants (Gall et al., 2007). The case-study approach can be used to study almost any phenomenon and is a common approach in health care and education (Gall et al., 2007). The phenomenon of interest for this case study was the use of handheld computers by a group of baccalaureate Canadian nursing students and the relationship this technology had with establishment and maintenance of caring relationships. The real-life context was the acute care adult surgical unit in a local hospital where students participated in clinical practica, students provided care for patients, and patients received care from nursing students and nurses.

The case study method includes participant interviews of the people involved in an activity (Yin, 2009) such as use of handheld computers and caring. Case study is an appropriate method when the researcher wants to know the patient and student perspective through interviews. The case study method also includes sources of data such as documents and artifacts (Yin, 2009). As nursing student participants were learning about caring practice it was important to include analysis of nursing program documents such as course syllabi, program aims, as well as nursing practice documents such nursing standards, competencies of the nursing graduate, and policy regarding use

of handheld computers. Students used technology such as handheld computers and programs; therefore, it was important to include data regarding the artifacts.

The majority of the research regarding caring or use of handheld technology uses sources of data such as interviews and/or surveys. The case study's unique strength is its ability to include a full variety of evidence such as interviews, documents, and artifacts (Yin, 2009) beyond what might be available if only patient interviews or only documents were included in the research. The case study method allowed this study to "retain the holistic and meaningful characteristics of real-life events" (Yin, 2009, p. 4) such as the use of handheld computers by nursing students who were establishing and maintaining caring relationships with patients.

Case study research is an in-depth study of a single case or multiple cases. Gall et al. (2007) stated, "[a] case is a particular instance of the phenomenon" (p. 447). The first step in case study research is to find the "case" to study (Creswell, 1998). Finding a "case" involves selection of sites or individuals to study (Creswell, 1998). Specifying the case is comparable to specifying the population in a quantitative study (Gall et al., 2007). The case in this study was a baccalaureate nursing education program. This case was bounded by time through nine months of data collection from May 2008 to February 2009 and was bounded by place in that student participants provided patient care in a hospital.

The "unit of analysis" is the aspect or focus of the phenomenon that will be studied (Gall et al., 2007). According to Gall et al. any phenomenon has many aspects therefore, the researcher must choose a focus of the case that data collection and analysis will concentrate on. For example, in a single-case study design, a number of similar individuals involved in a program could be the unit of analysis (Gall et al., 2007). In this single-case study, the phenomenon is the relationship of handheld technology with nursing students' ability to establish and maintain caring relationships. The case is a baccalaureate nursing education program and the unit of analysis included four students and four patients (see Table 1). The four students were in the third year of a baccalaureate nursing program and used handheld computers when providing nursing care. Three students were female and one student was male. Four adult patients who received nursing care at the acute care adult surgical unit were also included in the unit

of analysis. Three patients were female and one patient was male. In addition, the unit of analysis included relevant documents such as the Northern Health *Decision Support Tool: Social Media Policy 2010* (see Appendix A for Documents).

Creswell (1998) explains that in case study research, the context of the case needs to be described. Establishing the context involves situating the case within its setting, and this requires the examination of a wide array of contextual material about the setting of the case, to provide an in-depth picture (Creswell, 1998). This study included examination of information about the social, historical, and economic setting of the nursing program, the college, and the health region in which it was situated. This information provided a detailed picture of the setting for this case study.

Yin (1993) stated “The term theory covers more than causal theories. Rather theory means the design of research steps according to some relationship to the literature” (p. 4). In the case study approach, theory can be employed in different ways. For example, theories might be absent from the study, with the focus instead being on a description of the case and its issues (Creswell, 1998). Theories can also be used to guide the study, or theory can be employed toward the end of the study (Creswell, 1998). In this study, theories related to the concept of caring were used to guide the study. Theory can also help select the case to be studied and help define an appropriate description of the concepts of interest (Yin, 1993). Following the recommendations of Yin (1993) this study was framed within the concepts of caring and an ethic of caring, as well as four competencies in regard to caring and the use of technology that are expected of the new graduate nurse.

### **3.3.2. Challenges of Case Study Approach**

Identifying the case and deciding what bounded system to study is one challenge of case study research (Creswell, 1998). If the boundaries do not have a discrete beginning and end, determining the boundaries can be difficult (Creswell, 1998). Deciding how the case can be constrained in terms of time and events is difficult if the boundaries need to be contrived (Creswell, 1998). This case did not have discrete beginning or ending points, and therefore, it was decided that the case would be bounded by a nine-month period of data collection. The time frame was influenced by

the dates of the students' clinical experiences and the length of time it took to invite patients to participate in the study. Space boundaries were established by deciding that the acute care adult surgical unit in a local hospital would be the study site. This site was chosen because of its convenience for the researcher. The researcher had previously worked as a nurse on this unit, all four of the patients received care on this unit, and three of the four students were doing their clinical experience on this unit. The fourth student was doing his clinical experience on the pediatrics unit. The pediatrics unit routinely provides care for a limited number of adult patients. This student's patient was transferred to the surgical unit while he was caring for her.

The researcher must also decide whether to study a single case or multiple cases (Creswell, 1998). More cases allow greater generalizability (Creswell, 1998), however the ability to generalize the findings of case study research is limited (Gall et al., 2007). Gall et al. also state that multiple-case design tends to weaken rather than strengthen the study. Multiple cases reduce the attention that can be given to any one case (Gall et al., 2007). Selection of more than one case was beyond the capacity of this study, as there was one researcher with limited resources in terms of time and finances. However, such limitations can also contribute to a study, as more than one case decreases the depth in any single case and dilutes the overall analysis (Creswell, 1998).

Challenges with data collection are usually related to interviews and observation (Creswell, 1998). If there was inadequate information to provide an in-depth picture of the case, the case study could have limited value (Creswell, 1998). It is important to have adequate information from a variety of data sources to provide an in-depth picture of the case. In this study, the information provided by the eight participant interviews, the artifacts (handheld computer devices and programs), and the documents (see Appendix A) provided an in-depth picture of the case.

### **3.4. Purposeful Sampling Strategies**

A purposeful sampling process was used to select the case in this study. The rationale for the purposeful sampling strategy needs to be established for selection of



the case, and for gathering information about the case (Creswell, 1998). The purpose in selecting the case is to develop a deeper understanding of the phenomenon (Gall et al., 2007). In purposeful sampling, the goal is to select a case that will be rich with information reflecting the purposes of the study (Gall et al., 2007). The selected participants and documents will best help the researcher achieve an in-depth understanding of particular individuals (Gall et al., 2007) and an understanding of the research questions (Creswell, 2003). With case study research, a variety of possibilities for purposeful sampling are available; for example, ordinary cases, accessible cases, or unusual cases can be selected to show different perspectives on the issue that is being portrayed (Creswell, 1998).

This case was selected because this nursing program is unique with respect to curriculum and a northern geographic location. This curriculum was developed to address the health care needs of a northern Canadian population with attention toward health care settings such as rural, community, acute care, and nursing with First Nations communities (Northern Collaborative Baccalaureate Nursing Program [NCBNP], 1996). While this uniqueness may limit the generalizability of the findings, it will also add to the growing body of knowledge regarding use of technology in nursing, development of caring relationships, and nursing education. In addition, this case was accessible to the researcher.

The purpose of this case study was to examine how the use of handheld technology was related to nursing students' ability to establish and maintain caring relationships. This purpose fits with the theory-based or operational-construct sampling approach. This approach to sampling is used when the purpose of the study is to gain understanding of real-world manifestations of theoretical constructs (Gall et al., 2007). The concepts of caring and caring relationships used in this study are examples of theoretical constructs. The real-world manifestations of caring in this case study were examined in the context of the acute care adult surgical unit in a local hospital.

The college offered the first and second year of the baccalaureate nursing program. The university was the collaborative partner of the college and offered the third and fourth year of the program. The researcher was one of the college's educators responsible for administration of the first and second year of the nursing program. Gall

et al. (2007) recommended selecting the study sample in a way that allows any member of the population to be a participant. For example, this study gave all third year students who used a handheld computer in the clinical area an opportunity to volunteer for the study. There were no incentives for study participants. This approach decreased the risk of students feeling coerced to participate in the study.

**Table 1. Study Participants**

|           | <b>Gender</b> | <b>Developmental Stage</b> | <b>Cared for a Patient Participant</b>    |
|-----------|---------------|----------------------------|---|
| Student 1 | Male          | Young Adult                | Yes – Patient 1                           |
| Student 2 | Female        | Young Adult                | Yes – Patient 2                           |
| Student 3 | Female        | Young Adult                | No  |
| Student 4 | Female        | Young Adult                | No  |
|           | <b>Gender</b> | <b>Developmental Stage</b> | <b>Cared for By a Student Participant</b> |
| Patient 1 | Female        | Middle Adult               | Yes – Student 1                           |
| Patient 2 | Female        | Late Adult                 | Yes – Student 2                           |
| Patient 3 | Male          | Young Adult                | No  |
| Patient 4 | Female        | Late Adult                 | No  |

Note. Young Adult (18-35 years); Middle Adult (36 – 55 years); Older Adult (older than 55 years).

The four student participants in the study were recruited from a class of 79 students in the third year of the program (see Table 1). Third-year students were chosen in part to avoid potential conflicts of interest that could have arisen between the researcher and the students, had first- and second-year students been involved. Since the college offered the first and second year of the nursing program, the researcher could have had input into the progression of first- and second-year nursing students. The researcher had no input into the progression of third-year students, which eliminated the above mentioned potential for conflicts of interest. Fourth-year students were not selected to participate in the study as there was a possibility that they would graduate from the program prior to the end of the data-collection phase.

All student participants owned their handheld computer. Students either had a “Palm Pilot” or an “HP Pocket PC.” Students had a variety of programs on their handheld computers, many that came with it and some that students had downloaded such as Nursing Central. All students had a calendar or scheduling function. Students

also had programs that helped them calculate safe dosages of medications. In addition, students had programs that helped them with their terminology and their charting. Students stated they used handheld computer programs such as a drug guide, a laboratory guide, a medical dictionary, and a medical text reference. Students who volunteered for the study may have been more comfortable and familiar with technology than students who did not volunteer for the study.

Four adult patients volunteered to participate in this study from the cohort of 52 patients who received nursing care on the acute care adult surgical unit situated in a local hospital (see Table 1). Two patients (patient 1 and 2) were invited to participate in the study by two student participants (student 1 and 2). Student 1 cared for patient 1 and student 2 cared for patient 2. The other two students (students 3 and 4) in the study were not able to invite patients to participate in the study, in spite of their many attempts. These students may not have cared for patients who were willing to participate. Therefore, the researcher requested permission from the Ethics Review Board of Simon Fraser University (SFU) to revise the method of recruiting patients, and received approval (Application #38661). The researcher was then able to invite two patients (patients 3 and 4) to participate in the study. The researcher decided patients 3 and 4 would be able to provide data relevant to the study questions as they had received care on the same acute care adult surgical unit as patients 1 and 2, they were familiar with care from both nurses and nursing students, and had the potential to provide perspectives in contrast to the patients who were cared for by student participants with handheld computers.

Patients 3 and 4 were selected from the pool of patients who had received nursing care on the same acute care adult surgical unit where patients 1 and 2 were recruited. Patients 3 and 4 received nursing care from nurses and nursing students; however they did not receive care from students who participated in the study. The nurses and students that provided care for patients 3 and 4 may or may not have used handheld computers. Patients 3 and 4 discussed the use of handheld computers from the context of their personal experiences rather than experience with student participants' use of handheld computers.

None of the patient participants were selected based on their familiarity or comfort with computers. The patients' familiarity with computers was unknown prior to them being recruited to participate in the study. Patients who volunteered for the study may have been more comfortable and familiar with technology than patients who did not volunteer for the study. As all of the patients were familiar with handheld technology in varying degrees they may have been more receptive to the use of handheld technology at the bedside. In addition, patient 2 was a retired nurse; therefore, she may have been more receptive to nursing students than other patients.

Patient 1 worked as a teachers' assistant and worked with computers such as laptops, desktops, and had experience using a Blackberry. Patient 1 was familiar with computer programs such as the Curswell reading program. She used a Blackberry as part of a study that took place in the school where she worked. Patient 1 used the Blackberry to access math questions, and look up spelling, geography, and science information. Patient 1 thought the Blackberry enabled her to develop good rapport with students because the students thought the device was "cool."

Patient 2 was the least familiar with computers. She had a cell phone, but only used it for making phone calls as she did not know how to take photos with her cell phone. She has seen her daughter use a handheld computer and has observed her physician using a handheld computer to access medication information. Patient 2 has also seen some of the nursing students use handheld computers. Patient 2 was a retired nurse and talked about how students are assuming more responsibility and more of a leadership role than when she was a nursing student.

Patient 3 was the most familiar with computers. Patient 3 had a desktop computer at home and a PDA that he described as having wireless network connectivity, and Microsoft functionality with programs such as word, excel, and games. Patient 3 also used his device to make phone calls, text, and check email. Patient 3 commented he was trying to teach himself some programming.

Patient 4 was familiar with a Palm Pilot and mentioned her son had one that he used for scheduling work and school activities. Patient 4 also said she had a friend who could access her email on her handheld computer. Patient 4 worked part-time but did

not use a computer at work. Patient 4 used a desktop computer at home for email, writing letters, and looking up medical information. Patient 4 was on Facebook and used it stay in touch with family. Patient 4 commented she could get carried away on the computer.

### **3.5. Ethical Considerations**

The study proposal was reviewed and approved by the SFU Ethics Review Board (Application #38661) and the Research Review Committee of Northern Health (File #RRC-2008-0008) where the college and local hospital were located. Although the participants in the study were not minors or people with disabilities, they could still have been considered vulnerable. There was a power differential between students, patients, and the researcher, which could have increased the likelihood of risk to participants. Specifically, four of the participants were students in a nursing education program and four of the participants were patients who received nursing care in a local hospital. The patients may have been concerned that their nursing care could have been altered based on their participation in the study. The students may have been concerned that their progress in the nursing program may have been impacted by their participation in the study.

As outlined by Gall et al. (2007) and the Behavioural Research Ethics Board policies at both the university and health region, measures need to be in place to ensure the participants provide informed consent and their confidentiality is maintained. To ensure the participants were informed about the research, each participant received a document that explained what would occur during the research (see Appendix B for the Study Information Document). The Study Information Document explained what information was to be disclosed, how the collected data would be used, and the conditions of his or her participation. Each participant was informed that they could withdraw from the study at any time without penalty. To ensure participants provided informed consent, the researcher obtained informed written consent from each participant prior to each interview (see Appendix C for the Consent Form). As all the participants were adults, they had the ability to give written consent. Research

participants were provided with a hard copy of the informed consent form prior to the interview.

The Study Information Document also described how participants' confidentiality would be maintained (see Appendix B for the Study Information Document). Research participants were told prior to being interviewed that the researcher would be the only person to have access to the data. The participants were informed that only the researcher would have a complete list of the names of the study participants. The students were all in the same year of the nursing program and knew each other but the researcher did not inform the students of the others who participated in the study. The only exception was the two patient participants who students had invited to participate in the study. These student and patient participants knew each other by name. Participants were also informed that their names would not be included in any reports or publications that resulted from the study.

### **3.6. Data Sources**

Case study research can explore a range of topics within a program, an event or an activity, or among individuals (Creswell, 1998). Defining a unit of analysis, and a sample within it, can make data-collection manageable, and still allow for meaningful conclusions to be arrived at during data analysis (Gall et al., 2007). This study examined students in a particular nursing program. The activity was nursing students' ability to establish and maintain caring relationships while using handheld computers. The participants in the study were four students who used handheld technology, and four patient participants who received care in the acute care adult surgical unit of a local hospital. Relevant documents were also examined, such as policies and guidelines on the use of technology from the health region and the nursing program (see Appendix A for Documents).

One feature of case study research is that it allows detailed, in-depth data collection involving multiple sources of information rich in context (Creswell, 1998). According to Yin (2009), a major strength of case study data collection is the use of multiple data sources. Yin (2009), listed six sources of evidence commonly used in case

studies: “documentation, archival records, interviews, direct observations, participant-observation, and physical artifacts” (p. 101). This study used three data sources: interviews, documentation and physical artifacts.

### **3.6.1. *Evidence Obtained from Interviews***

Yin (2009) claims “Interviews are an essential source of case study evidence because most case studies are about human affairs or behavioral events” (p. 108). The participant interviews from both students and patients were the most important source of data for this case study. This case study used a semi-structured or focused interview format (Gall et al. 2007; Yin, 2009). The researcher followed a structured set of questions then probed more deeply with open-ended questions to gain further information. This approach provides reasonably standard data of increased depth than a structured interview approach (Gall et al., 2007). Each participant was interviewed for approximately one hour. The interviews followed a set of questions outlined in the case study protocol (see Appendix D for the Interview Protocol). As recommended by Yin (2009) the interviews were audiotape recorded to provide an accurate rendition of the interview. The participants provided important insights regarding their opinions, such as their thoughts about caring.

### **3.6.2. *Evidence Obtained from Documents***

Information obtained from documents related to the use of technology in the clinical area was also relevant to this case study. The strengths of the documents selected as a source of information for this study were consistent with those identified by Yin (2009). The strengths of the documents used in this case study included the following characteristics: the documents were stable and they could be reviewed repeatedly; the documents were unobtrusive, as they were not created as a result of this case study; and the documents were exact, as they contained precise details related to the phenomenon. Yin (2009) also identified weaknesses in the use of documents as a source of information including: issues of retrievability; possible bias in the selection of the documents and the reporting of the documents; and lack of access to relevant documents. There were issues of retrievability in this study, as some documents were difficult to find; lack of access to relevant documents may have resulted in some

documents not being included; and researcher biases may have influenced the selection and reporting of the documents.

Yin (2009) states documents provide important evidence to augment the evidence from interviews. For example, in this study documents regarding the use of technology in the clinical setting provided important evidence regarding the context of the case study. According to Yin (2009), inferences can be made from documents, although these inferences should be treated as clues to be investigated. Yin (2009) pointed out that it is critical to recognize that external documents have not been written for the purposes of the case study. It is important to identify the objectives of the written documents in order to correctly interpret their contents (Yin, 2009). A document summary form was used to summarize information obtained from documents related to technology (see Appendix E for the Document Summary Form). Examples of documents include college documents such as those relating to the Palm Pilot project implemented at the college, and documents from the health region regarding use of technology in the practice setting.

### **3.6.3. *Evidence Obtained from Physical Artifacts***

According to Yin (2009), physical artifacts such as technological devices are another source of evidence. Handheld computers were the technological devices used in this study. For example, some students showed the researcher what handheld equipment and programs they were using in the clinical area. The handheld equipment and programs students' used stimulated discussion during the interview process.

## **3.7. Data Collection**

According to Gall et al. (2007), in case study research, data collection is an emergent process. Data collected at one point during the study informs the researcher regarding subsequent data collection. Through data collection, a detailed description of the case emerges (Creswell, 1998). The description of the case provides a detailed view of aspects about the case and described events.



### **3.7.1. *Data Collection: Interviews, Documents, and Physical Artifacts***

The data collected in this study included student and patient interviews, physical artifacts, and documents such as nursing program syllabi and Northern Health policy (see Appendix D for Interview Protocol, and Appendix A for Documents). Data collection included audiotaped recordings of face-to-face, one-on-one nursing student and patient interviews. Gall et al. (2007) recommend the use of a contact summary form to summarize data-collection events; this recommendation was followed for this study (see Appendix F for the Contact Summary Form). Documents examined included those from the college, such as nursing program course syllabi, program development and implementation reports, nursing program student handbook, documents relating to the Palm Pilot project, and documents describing the college (see Appendix A for Documents). Health region documents included information about the health region and policy regarding use of technology in the practice setting. CRNBC documents were also examined such as, requisite skills and abilities, and practice standards. Physical artifacts that were analyzed included handheld computer devices and programs the students used. This data collection provided a detailed picture of the use of handheld computers within the framework of caring in the nursing program.

### **3.7.2. *Data Collection and Interview Questions***

The “emergent” characteristic of qualitative research such as case study, allows the interview questions to change and be refined as the researcher learns what to ask, and the data collection process of one-on-one interviews may also change (Creswell, 2003). During the process of the research in this study, the questions asked of participants were reviewed and refined. The data-collection process of individual interviews remained the same, but the process of interviewing the participants evolved as the researcher became more experienced. For example, the first interview was transcribed and sent to a dissertation supervisor for feedback regarding the quality of the data collected. The supervisor commented that the questions worked well; however, she recommended against asking too many questions. Her advice was to keep to key questions and follow-up probes. The supervisor also recommended phrasing questions

so they were open-ended. These recommendations were incorporated in subsequent participant interviews.

### **3.8. Researcher's Role**

One of the challenges that can occur in qualitative research is confusion about the role of the researcher (Creswell, 2003). This role confusion may ultimately compromise the researcher's ability to disclose information, and raise the potential for power issues (Creswell, 2003). It is important that the researcher provide statements about past experiences and connections between the researcher and the participants (Creswell, 2003). The researcher's current and previous roles were discussed with all participants prior to the one-on-one interviews. Information regarding the research that was provided to the employees at the university and a local hospital also helped to decrease the potential for role confusion.

The researcher was a former instructor at the College, formerly held an adjunct position at the university, and formerly worked as a staff nurse at a local hospital. In order to mitigate concerns regarding role confusion, the researcher did not occupy any of these three roles during the study. Students may have felt compelled to please the researcher due to her previous roles; however, students were motivated to participate because of their interest in handheld computers.

During the study, the researcher was an associate dean at the College, which was the reason that students in the first and second years of the program were not included in the study. All four of the student participants had been previously in the first and second year of the program offered by the college; they were advised that the researcher did not have any input into their progression in the nursing program. Student participants were informed that their responses during the interview, and the responses of the patients, would not be used to evaluate their performances as nursing students (see Appendix B for the Study Information Document). Their individual responses were kept confidential; they were, therefore, not shared with the faculty who were responsible for evaluation of their performances as nursing students.

### **3.9. Site Relations**

With case study research, typical issues regarding access to participants at particular sites include gaining access through a gatekeeper and gaining the confidence of the participants (Creswell, 1998). Positive relationships with the administrators of the sites where participants will be contacted are essential (Gall et al., 2007). The researcher had existing positive professional relationships with administrators at the two sites where participants were contacted – the university and a local hospital. The researcher gained access to student participants through the university. The university did not require their own ethics approval, as the study had received approval from the Ethics Review Board of SFU and the Research Review Committee of Northern Health. One of the researcher's supervisors was tenured faculty at the university site where students were contacted, which helped in securing cooperation for carrying out the research. The Chair of the School of Nursing at the university knew the researcher and granted permission for the researcher to contact third-year nursing students via the university's School of Nursing email list serve. The researcher gained access to patient participants at a local hospital, where the chair of the Research Review Committee also knew the researcher. The researcher gained access to patient participants following approval of the study proposal by the Northern Health Research Review Committee.

### **3.10. Conclusion**

The qualitative case study approach was an appropriate research method for this study. The single case design was within the researcher's resources. The purposeful-sampling strategy allowed for a deep understanding of the phenomenon under study. The data sources selected made data collection manageable and provided an in-depth picture of the case. Potential role confusion was addressed and potential power issues were minimized as much as possible. Most importantly, the researcher protected the rights of the human participants. The study proposal was reviewed and approved by the Ethics Review Board of SFU in British Columbia and the Research Review Committee of Northern Health in the health region where the college and hospital were located.

## **Chapter 4.**

### **Qualitative Analysis**

This chapter outlines the approach used to analyze the research data. It discusses qualitative content analysis, the process of content analysis, the trustworthiness of the data, and challenges of content analysis. It also describes the framework for how caring was recognized in this study.

#### **4.1. Qualitative Content Analysis**

Qualitative content analysis was the research method of analysis used in this study. This approach to data analysis was applied to two of the sources of research data: interviews and documents. Hsieh and Shannon (2005) define qualitative content analysis as the “subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns” (p. 1277). According to Cole (1988), content analysis is a method of analyzing written and verbal communication messages. Other writers point out that content analysis is a systematic and objective means of describing phenomena (Downe-Wamboldt, 1992; Krippendorff, 1980; Sandelowski, 1995). The use of this method allows the researcher to make replicable and valid inferences from data to their context, with the purpose of providing knowledge, new insights, a representation of facts and a practical guide to action (Krippendorff, 1980). A key feature of content analysis is that the many words of the text contained in the original data are classified into much smaller content categories (Burnard, 1996; Weber, 1990). Content analysis is a qualitative approach often used in nursing research and education and has been applied to a range of types of data and to various depths of interpretation (Graneheim & Lundman, 2004).

In this study, content analysis made it possible to distil words into fewer content-related categories. The *aim* of using content analysis was to attain a condensed and broad description of the phenomenon. The *outcome* of content analysis was the determination of categories that described the phenomenon.

#### **4.1.1. Benefits of Content Analysis**

One of the benefits of content analysis is that it is a content-sensitive method (Krippendorff, 1980). Content analysis can be used to understand the meaning of communication (Cavanagh, 1997) and to identify critical processes (Lederman, 1991). Content analysis is concerned with meanings, intentions, consequences, and context (Downe-Wamboldt, 1992).

Another advantage of content analysis is that it allows the researcher to gain information directly from participants in the study without imposing preconceived categories (Hseih & Shannon, 2005). The basis of the knowledge generated by the content analysis method is the unique perspectives of the participants, and this knowledge is grounded in actual data (Hseih & Shannon, 2005). Content analysis was a good fit with the case-study approach used in this study, and was also a good fit with the research questions.

#### **4.1.2. Challenges of Content Analysis**

Flexibility, the lack of a firm definition and procedures, has potentially limited the application of content analysis (Tesch, 1990). As there are no simple guidelines for data analysis, each inquiry is distinctive, and the results depend on the skills, insights, analytic abilities and style of the researcher (Hoskins & Mariano, 2004). Content analysis does not proceed in a linear fashion and is more complex and difficult than quantitative analysis because it is less standardized and formulaic (Polit & Beck, 2004). A challenge of content analysis in this case study was its flexibility, as there was no simple “right” way of performing the analysis.

Reporting the study and presenting the results were also challenging stages in this study, as the results were formed through a process that was comprised of a

number of phases. Describing the analysis process was one of the most challenging phases of the study. If the qualitative data were compressed too much, the very point of maintaining the integrity of narrative materials during the analysis phase could become lost. For example, if a student's discussion of caring is compressed to one phrase or word, the detail and depth of the data would be missed. If the conclusions were merely summarized, without including numerous supporting excerpts, the richness of the original data could have disappeared.

With an incomplete process of analysis, there is a risk that the researcher will not abstract the data or will include too many different data points in a category (Dey, 1993; Hickey & Kipping, 1996). One challenge of content analysis is to avoid forming an incomplete understanding of the context, thus failing to identify key categories. In this case study, such a failure could have resulted in findings that did not accurately represent the data. When the saturation of the data is incomplete, it may be difficult to link data items to each other (Cavanagh, 1997; Patton 1990). An abundance of categories would have been a sign of having been unable to categorize the data. If there were more citations than authorial text, then the analysis process would have been incomplete.

According to Hsieh and Shannon (2005), another challenge facing researchers is that content analysis can be confused with other qualitative research methods, such as grounded theory. The initial analytical approach of content analysis has similarities to those other methods; however those other methods, such as grounded theory, go beyond content analysis to develop theory. One way of differentiating between grounded theory and case study methods is considering the central purpose of the methods. The purpose in grounded theory is to generate a substantive theory where "the researchers use systematic procedures for analyzing and developing this theory" (Creswell, 1998, p. 38). At most, the result of content analysis is concept development (Hsieh & Shannon, 2005). The sampling and analysis procedures of content analysis used in this study allowed application of caring theory, but did not develop theory.

## 4.2. Inductive and Deductive Reasoning Approaches

Creswell (2003) described the thinking process of data analysis as “iterative with a cycling back and forth from data collection and analysis to problem reformulation and back” (p. 183). Both inductive and deductive processes can be used with a content analysis approach (Creswell, 2003). Although the reasoning in this study was largely inductive, both inductive and deductive processes were used. With an *inductive* approach, analysis moves from the specific to the general, so that particular instances are observed and then combined into a larger whole or general statement (Chinn & Kramer, 1999). For example, in this study data from particular participant interviews were combined into a larger whole that allowed for comparison of responses to a particular question and see emergent themes across their responses. An *inductive* approach to content analysis was used in this study, as knowledge about how the use of handheld computers was related to nursing students’ ability to establish and maintain caring relationships was limited. The categories were derived from the data using *inductive* content analysis.

*Deductive* reasoning was used as well during the analysis of the study data. A framework for recognizing caring was used to analyze the concept of “caring” in this study. The components of the framework were derived from the work of Tarlow (1996), Noddings (1984), Watson (2006), Benner and Gordon (1996), Benner and Wrubel (1989), and Rieman (1986). For example, framework components such as “time” and “be there” guided the analysis of the interview data related to the concept of “caring.” In applying the theoretical framework concepts to the data analysis, several insights were gained into the role of “caring” within the student and patient relationship. There was no intent to add to the caring framework. The caring framework guided the analysis of the data and was used when presenting the findings from the data.

### 4.3. Steps in Data Analysis

According to Creswell (2003) data analysis includes the following generic steps:

- Organize and prepare the data for analysis;
- Read through all the data;
- Coding process;
- Use the coding process [inductive and deductive] to generate a description of the setting or people, as well as themes for analysis;
- Advance how the description and themes will be represented in the qualitative narrative;
- Make an interpretation of the data.

(pp. 190-195)

The foregoing steps were used to analyze the data of this study.

#### 4.3.1. ***Step 1: Organize and Prepare the Data for Analysis***

##### **Unit of Analysis**

The preparation phase starts with selecting the unit of analysis (Cavanagh, 1997; McCain, 1988). In case study research a unit of analysis is “the aspect of the phenomenon that will be studied across a sample of cases” (Gall et al., 2007, p. 657). The unit of analysis in this case study included eight participant interviews and relevant documents such as the Northern Health *Decision Support Tool: Social Media Policy 2010* (see Appendix A for Documents). The interviews were conducted with four nursing student participants and four patient participants. The relevant documents included data regarding policy in relation to the use of technology and data regarding the Palm Pilot project at the college, for example. The unit of analysis was large enough to be considered “a whole unit” and small enough to be kept in mind as a context for a “unit of analysis” during the analysis process.

##### **Manifest and Latent Content**

It also had to be decided whether to analyze only the manifest content or the latent content of the data. Analysis of manifest content is the analysis of what the text in the data says, and describes the visible, obvious components (Downe-Wamboldt, 1992;



Kondracki & Wellman, 2002). Analysis of latent content is the analysis of what the text talks about. It deals with the relationship aspect of the data, and involves an interpretation of the underlying meaning of the text (Downe-Wamboldt, 1992; Kondracki & Wellman, 2002). The aim with analysis of latent content is also to notice such signals from interviewees as silence, sighs, laughter, and posture, for example (Burns & Grove, 2005; Catanzaro, 1988; Robson, 1993). Both types of content deal with interpretation but the interpretations vary in depth and level of abstraction. Researchers are guided by the aim and research questions of the study in choosing the contents they analyze (Robson, 1993). In this study, manifest content was the primary focus of the analysis, as the data collected was audio-recorded interviews and written documents that were comprised of words, rather than silence, sighs, laughter or posture. However, as the concept of caring was part of the aim and research questions, this study deals with the relationship aspect of the data, and involves an interpretation of the underlying meaning of the text, latent content was also addressed in the analysis of the data.

### **Organize and Prepare the Data**

Once decisions were made about the unit of analysis and that latent and manifest content would be analyzed, the next step of analysis involved organizing and preparing the data. For the documents, the first step in preparing the data for analysis was comprised of retrieving those that were relevant and filing them in one place. The first step in preparing the data from the interviews of the participants involved downloading the recorded interviews onto a computer and then transcribing them. Transcribing the interviews allowed the researcher to get an overall sense of the data, through listening to the audio-taped interviews and transcribing what each participant said. Transcribing the interviews allowed for familiarity with the data, as it required listening to frequent repetitions of the taped interviews.

#### **4.3.2. Step 2: Read Through All the Data**

As recommended by Burnard (1991), Step Two of data analysis started with reading all the data repeatedly to achieve immersion and obtain a sense of the whole. The second step of data analysis was done with the interviews first then the documents. The aim of step two is to become immersed in the data (Burnard, 1991; Polit & Beck,

2004) therefore, the written material was read through several times. According to Dey (1993), the researcher needs to keep in mind the following questions when reviewing the data: 1) Who is telling? 2) Where is this happening? 3) When did it happen? 4) What is happening? and 5) Why? As recommended by Sandelowski (1995), the researcher read through each transcribed interview and each document as many times as necessary to apprehend its essential features, without feeling pressured to move forward analytically. This careful, repeated reading allows the researcher to gain a general sense of the data and to reflect on the overall meaning of the information (Creswell, 2003). The researcher took notes of ideas, first impressions, thoughts and initial analysis that occurred during this process to prepare for the third step of analysis.

#### **4.3.3. Step 3: Coding Process**

Gagnon (2010) recommends that the researcher next organize and classify the data in order to make it easier to analyze. This process included condensing and abstraction, coding, and generating categories. Condensing, abstraction, and developing the coding scheme were discussed in Step Three. Once the coding process was completed with the interview transcripts, the coding process was then done with the documents. Generating categories was discussed in Step Four of the analysis process.

#### **Condensing, Abstraction, and Meaning Units**

*Condensing* refers to a process of shortening while still preserving the core. Burnard (1991) called a process whereby condensed text is abstracted a “grouping together under a higher order” (p. 462). *Abstraction* means formulating a general description of the research topic through generating codes and categories (Burnard, 1996; Polit & Beck, 2004; Robson, 1993). For example, assigning a label to a “meaning unit” has been referred to as giving it a code. A meaning unit is “a section of a text that contains one item of information that is comprehensible for purposes of data analysis even if read outside the context in which it is embedded” (Gall et al., 2007, p. 652). A meaning unit, the constellation of words or statements that relate to the same central meaning, has also been referred to as a “content unit” or “coding unit” (Baxter, 1991). Generating categories involves naming each category using content-characteristic words. Subcategories with similar events and categories are grouped as main

categories (Dey, 1993; Robson, 1993). Abstraction allowed for emphasizing descriptions and interpretations on a higher logical level. The abstraction process continued as far as was reasonable and possible.

### **Develop the Coding Scheme**

The process of coding data consists of coding passages in the text that relate to concepts or categories connected to the phenomenon (Gagnon, 2010). Labeling a condensed meaning unit with a code allows the data to be thought about in new and different ways. According to Coffey and Atkinson (1996) “codes are tools to think with” and “heuristic devices” (p. 32). The process of analysis in this study involved a back-and-forth movement between the whole and parts of the text. The whole context was considered when condensing and labeling meaning units with codes. In the coding process a coding scheme developed that allowed the researcher to make decisions in the analysis of content.

After reading through the interview transcripts several times to obtain a sense of the whole, the text from the transcribed interviews was approached by making notes of first impressions, thoughts and initial analysis. Data were read word for word to derive codes, by first highlighting the exact words from the text that appeared to capture key thoughts or concepts (Miles & Huberman, 1994). The interview transcripts were read through again, and notes and headings were written in the text while reading it. As many headings as necessary were written down in the margins to describe aspects of the content as suggested by Burnard (1991; 1996), and Hsieh and Shannon (2005). The headings were collected from the margins and transcribed onto coding sheets as recommended by Cole (1988), Dey (1993) and Downe-Wamboldt (1992). These coding sheets were taken back to the data from the interview transcripts, and the headings were abbreviated as codes. As this process continued, labels for codes emerged that were reflective of more than one key thought, and these became the coding scheme.

#### **4.3.4. Step 4: Use the Coding Process**

##### **Generate Categories**

Once the coding scheme was developed in Step Three, the next step was to generate categories. A category is a group of content that shares a commonality and answers the question “What?” (Krippendorff, 1980). A category can be identified as a thread throughout the codes. A category in this study referred mainly to a descriptive level of content, and could thus be seen as expressing the manifest content of the text. For example, one category was comprised of “student learning” (see Appendix G for the Categories and Subcategories). A category often included a number of subcategories at varying levels of abstraction. For example, “nursing knowledge” was a sub-category in the “student learning” category (see Appendix G for the Categories and Subcategories).

The purpose of creating categories in content analysis is to provide a means of describing the phenomenon, to increase understanding, and to generate knowledge (Cavanagh, 1997). When formulating categories by inductive content analysis, the researcher comes to a decision, through interpretation, as to which data points to put in the same category (Dey, 1993). Dey (1993) recommends that data be classified as “belonging” to a particular group; this implies a comparison between those data and other observations that do not belong to the same category. A process of reflection resulted in decisions about how to sort the codes. Codes were sorted into categories based on how the different codes were related and linked. The various codes were compared based on differences and similarities, and sorted into categories. These emergent categories were used to organize and group codes into meaningful clusters as recommended by Coffey and Atkinson (1996) and Patton (2002). The aim of grouping data was to reduce the number of categories by collapsing those that were similar or dissimilar into broader, higher-order categories (as per Burnard, 1991; Dey, 1993; Downe-Wamboldt, 1992). To prepare for reporting the findings, exemplars for each category were identified from the data.

The abstraction process was used in the generation of categories and was continued as far as was reasonable and possible. To accomplish this, the lists of categories were grouped under higher order headings (Burnard, 1991; McCain, 1988). Each category was named using content-characteristic words. Subcategories with

similar events and categories were grouped as main categories (Dey, 1993; Robson, 1993).

Creating categories was the core feature of this qualitative content analysis. It was necessary to go back to the data, the interview transcripts and the documents, to check the reliability of the categories. Keeping the research questions in mind was an essential aspect of content analysis. The research questions were reviewed to look only for the meaning units that had relevance to them. Categories were established that were exhaustive and mutually exclusive. No data related to the purpose was excluded due to lack of a suitable category. No data fell between two categories or fit into more than one category. Once coding and generating categories were completed data had addressed all of the components of the caring framework, each of the themes related to student learning, and provided a detailed picture of the context of the study, therefore, saturation of the data was achieved.

#### **4.3.5. Step 5: Advance Description/Themes**

Step Five involved developing a narrative passage to convey the findings of the analysis (see Chapter Five, “Findings”). This writing included a detailed discussion of the themes, multiple perspectives from individuals, and quotations. Descriptive information about each participant was compiled into a table (see Table 1). Information about each document was compiled into an Appendix (see Appendix A for Documents).

#### **4.3.6. Step 6: Make an Interpretation of the Data**

In the final interpretive phase of data analysis, as recommended by Creswell (1998), a report of the “lessons learned” from the research was made and these were presented in Chapter Six. In the case study approach, the research is based on the rhetorical assumption demonstrated through the use of terms such as “credibility,” “transferability,” “dependability,” “confirmability,” and “naturalistic generalizations” (Creswell, 1998). This includes meaning derived from a comparison of the findings with information from the literature. New questions to be asked and action agendas for reform and change are also identified (Creswell, 2003). In addition, relevant theories and other research findings were addressed in the “lessons learned” section of this

study. The study findings were compared and contrasted to the literature, and a summary is included of how the findings contributed to knowledge in the area of interest. Suggestions are offered for practice, teaching, and future research.

#### **4.4. Trustworthiness**

It is widely recognized that research findings should be as trustworthy as possible, and every study must be evaluated in relation to the procedures used to generate the findings. Concepts within the quantitative research traditions still predominate when describing qualitative content analysis, especially the use of concepts describing trustworthiness; the use of these concepts can cause confusion among authors and readers (Graneheim & Lundman, 2004). Text involves multiple meanings and there is some degree of interpretation when analyzing text (Graneheim & Lundman, 2004). This interpretation of text was an essential issue when discussing trustworthiness of the findings of this study. Four characteristics of trustworthiness were addressed: credibility, dependability, reliability, and transferability.

##### **4.4.1. *Credibility***

Credibility deals with the focus of the research and refers to confidence in how well data and processes of analysis address the intended focus (Polit & Hungler, 1999). The first question concerning credibility arose when making decisions about the focus of the study, selection of context, participants and approach to gathering data. Choosing participants with various experiences increases the possibility of understanding the research question from a variety of aspects (Adler & Adler, 1988). In this study, the varying perspectives of student and patient participants answered the research questions. The researcher carefully selected the most appropriate method for data collection and the amount of data to be collected. These factors are also important in establishing credibility. In addition, the development of a good coding scheme was central to trustworthiness. Creating and adhering to the coding scheme increased trustworthiness of this study.

As suggested by Patton (1990), authentic citations were used to increase the trustworthiness of the research and to point out to readers from where or from what kinds of original data categories were formulated. Although the citations included the words of the participants, in keeping with Ford and Reutter (1990) and ethical guidelines set out within SFU and Northern Health, the participants were not identifiable by quotes from the data to protect their confidentiality.

The analysis process and the results need to be described in sufficient detail so that readers have a clear understanding of how the analysis was carried out, along with its strengths and limitations (General Accounting Office, 1996). As a result, the researcher chose to specifically focus a chapter on the analysis of the data to guide the reader in understanding the presentation of the findings in the next chapters. As recommended by Gagnon (2010), consideration was given to whether the categories added something new to the description of the phenomenon and whether each category was the only one that could serve that purpose.

Another critical issue for achieving credibility in this study was selecting the most suitable meaning units. If meaning units were too broad they would have been difficult to manage since they were likely to contain various meanings. If meaning units were too narrow fragmentation could have occurred. In both cases there was a risk of losing the meaning of the text during the condensing and abstraction process, so it was ensured that the meaning units were neither too broad nor too narrow. Credibility of the research findings also includes how well categories cover the data (Graneheim & Lundman, 2004). The categories of this study covered the data well. No relevant data were excluded and no irrelevant data were included in the categories.

Credibility is also involved in the matter of how to judge the similarities within and differences between categories. This was approached by reporting representative quotations from the transcribed text and documents. Credibility can also be established through member checks (Lincoln & Guba, 1985; Manning, 1997). To this end, each participant was sent the transcript of their interview and findings of the study for their input. It was important to have participants' recognition of the study findings as another dimension of credibility in this study.

Credibility can be supported through triangulation of the data (Lincoln & Guba, 1985; Manning, 1997). A case study finding may be more convincing and accurate if the finding is based on different sources of information (Yin, 2009). Multiple sources of information provide multiple measures of the same phenomenon (Yin, 2009). In this study, if all study participants had the same comment about how students used handheld computers, the finding would be convincing. For example, all students and patients made comments about students' use of handheld computers to look up information.

#### **4.4.2.    *Dependability***

According to Lincoln and Guba (1985) dependability “seeks means for taking into account both factors of instability and factors of phenomenal or design induced changes” (p. 22). Dependability is related to the degree to which data changes over time, and alterations made in the researcher's decisions during the analysis process. When data are extensive and the collection extends over time, there is a risk of inconsistency during the data collection. In this study, the data collection did extend over a nine-month period of time. In addition, interviewing was an evolving process during which the researcher developed interviewing skills and acquired new insights of the phenomenon that subsequently influenced follow-up questions. However the interview protocol which was adhered to minimized the risk of inconsistency (see Appendix D for the Interview Protocol).

#### **4.4.3.    *Reliability***

It is important to make defensible inferences based on the collection of valid and reliable data (Weber, 1990). To increase the reliability of the study, it is necessary to demonstrate a link between the results and the data (Polit & Beck, 2004). These issues were addressed by describing the analysis process in as much detail as possible and connecting the data back to the research questions.



#### **4.4.4. *Transferability***

Transferability refers to “the extent to which findings can be transferred to other settings or groups” (Polit & Hungler, 1999, p. 717). It is the reader’s decision whether or not the findings are transferable to another context. To facilitate transferability, clear descriptions of context, selection and characteristics of participants, data collection and process of analysis were given (Graneheim & Lundman, 2004). A rich and vigorous presentation of findings with appropriate quotations also enhanced transferability. Trustworthiness was increased as the findings were presented in a way that allowed the reader to look for alternative interpretations. Demonstration of the reliability of the findings and interpretations was needed to enable someone else to follow the process and procedures of the inquiry.

#### **4.4.5. *Review of the Audit Trail***

The researcher made notes of the data collection process and steps of data analysis during the research process. Discussions with supervisors occurred during the study regarding the collection and analysis of the data. For example the researcher sent the transcription of the first interview conducted to supervisors for feedback regarding the interview process and the quality of the data collected. A supervisor provided the researcher with guidance regarding the interview process and suggested keeping to key questions and follow-up probes which was incorporated into subsequent interviews. The researcher also discussed the processes of coding the data and determining categories with supervisors to ensure the researcher was interpreting the data appropriately. In addition supervisors also commented on the findings of the research. Review of the audit trail with supervisors during the data collection and analysis phases of the research ensured objectivity during the analysis and ensured interpretational confirmability.

### **4.5. How Caring Was Recognized**

According to Tarlow (1996), Watson (2006), Noddings (1984), Benner and Gordon (1996), and Benner and Wrubel (1989), caring can only be effectively demonstrated and practiced interpersonally. In this study, the concept of caring was

examined in the context of the relationship between the patient and the nursing student, or between the patient and the nurse. Tarlow (1996) identified eight caring concepts that “constituted overlapping phases of the caring process: time; be there; talking; sensitivity; acting in the best interest of the other; caring as feeling; caring as doing; and reciprocity” (p. 57). These eight caring concepts were the basis of the analysis of the concept of caring:

1. Time: In order to be caring, the time and presence of the person are requirements (Tarlow, 1996). Watson (2006) discussed how the caring process is relational and connected, and transcends time, space and physicality. Rieman (1986) pointed out that if nursing care was hurried, patients felt dehumanized, devalued, angry and fearful;
2. Be there: Tarlow (1996) stated that “be there” meant the caring person was present and prepared to help. Noddings’ (1984) concept of engrossment describes the one-caring as present and receptive to the cared-for. According to Watson (2006), and Benner and Wrubel (1989), the caring relationship involves the ability to be present, to be with a patient. Watson (2006) and Noddings (1984) also identified that the caring relationship calls for the one-caring to enter and stay within the other’s frame of reference;
3. Talking: Talking is an important means of building and maintaining caring relationships, and an important piece of how caring happens (Tarlow, 1996). Benner and Gordon (1996) discussed caring as the ability to hear who the other is. Noddings (1984) saw dialogue as important in nurturing the ethical ideal of caring. Watson (2006) identified the importance of promotion and acceptance of the expression of positive and negative feelings, which would include talking;
4. Sensitivity: According to Tarlow (1996), noticing the needs of others is part of sensitivity. Noticing which interventions help, and noticing subtle signs of improvement or deterioration in the patient is part of caring (Benner & Wrubel, 1989). Noddings’ (1984) concept of engrossment is one of feeling and sensitivity. Watson (2006) identified the need for opening to others with sensitivity and compassion;
5. Acting in the best interest of the other: Those caring want to understand what needs to be done in order to achieve some desired end that would assure the well-being of the person (Tarlow, 1996). According to Noddings (1984), the one-caring acts to protect, enhance and promote the well-being of the cared-for. The nurse’s moral commitment is to protect, enhance, promote, and potentiate human dignity, wholeness, and healing (Watson, 2006). Watson (2006) commented that caring is a moral ideal rather than a task-oriented behavior. According to Benner and Gordon (1996), the

central issue is not whether the best is wished for the patient, but whether the set of practices that are required when there is a need for someone to be cared for can be created;

6. Caring as feeling: Feelings of concern and/or affection about the person are tied to why people cared (Tarlow, 1996). Caring relations are guided by feeling (Benner & Gordon, 1996). According to Noddings (1984), “caring for” involves a “feeling with the other” for the one-caring. This “feeling with” involves reception or engrossment (Noddings, 1984). In caring relationships the ability to move back and forth between instrumental thinking and feeling must be retained (Noddings, 1984). Watson (2006) identified the importance of promotion and acceptance of the expression of positive and negative feelings;
7. Caring as doing: Doing things involves thinking about, negotiating and carrying out what was deemed best for the other (Tarlow, 1996). Caring enables recognition of a problem, and identification and implementation of solutions (Benner & Wrubel, 1989). Instrumental thinking can help to determine what to do once the one-caring has committed to doing something (Noddings, 1984). An observer can judge caring by determining whether the action of the one-caring brings about a favorable outcome for the cared-for (Noddings, 1984). According to Benner and Wrubel (1989), knowing and doing are inseparable in caring. Without a set of caregiving skills and practices, the person cannot join in being a caregiver (Benner & Gordon, 1996);
8. Reciprocity: “The efforts of the caring person must be perceived and interpreted as valued by the person cared for” (Tarlow, 1996, p. 80). The reception of caring becomes part of what the one-caring feels when she receives the cared-for (Noddings, 1984). A fully participating cared-for who gives genuine reciprocity to the relation sustains and invigorates the one-caring (Noddings, 1984). Some patients, through their trust, openness, and capacity to receive and extend the care they are given, participate in caring relationships that become transformative (Benner & Gordon, 1996).

In addition to the eight concepts identified by Tarlow (1996), two additional factors were also included in the analysis of the concept of caring: Self-care of the one-caring and what constitutes non-caring.

1. Self-care: Caring for the self is a prerequisite to caring for others (Watson, 2006). The ethic of care advocates a deep and steady caring for self (Noddings, 1984).
2. Non-caring: The one-caring may become non-caring if the focus remains on instrumental thinking or problem solving (Noddings, 1984). Patients described non-caring as the nurse not “being present,” but there only to get the job done (Rieman, 1986). If detachment was a

preferred method of coping for nurses, they may become non-caring (Benner & Wrubel, 1989). Treating the person as a type instead of an individual objectifies the person, and the person becomes a case instead of an individual (Noddings, 1984).

## **4.6. Conclusion**

The goal of content analysis is “to provide knowledge and understanding of the phenomenon under study” (Downe-Wamboldt, 1992, p. 314). An advantage of the method in this study was that large volumes of textual data and different textual sources such as interviews and documents could be dealt with and used in corroborating evidence. A disadvantage of content analysis that needs to be kept in mind is the potential for excessive interpretation, which may pose a threat to successful content analysis.

The content analysis method focuses on the subject and context, and emphasizes differences between and similarities within codes and categories. The basic coding process in content analysis is to organize large quantities of text into much fewer categories (Weber, 1990). The success of content analysis depends greatly on the coding process. The method could deal with manifest as well as latent content in text. In this study, analyzing content close to the text, the manifest content, was a suitable starting point for analyzing the latent content related to the concept of caring, the relationship aspect of the data, and interpretation of the underlying meaning of the text. This content analysis research was focused on text data that was obtained from audio-taped interviews, and print media. Content analysis was well suited for analyzing the multifaceted phenomena of this study.

## **Chapter 5.**

### **Findings**

This chapter outlines the findings of this case study. In case study research, the context of the case needs to be described. Description of the context of the study includes how caring was recognized and the settings where the handheld computer was used. Information about the social, historical, and economic setting of the nursing program, the college, and the health region in which the nursing program is situated was also examined. This information provided a detailed picture of the context of this case study. The findings reflect the perspectives of student and patient participants and focus on the relationship of the handheld computer with caring relationships. In this study, the concept of caring was examined in the context of the relationship between the patient and the nursing student, or between the patient and the nurse. Two of the patient participants in the study received care from student participants. The other two patient participants received care from nurses and students who were not participants in this study.

#### **5.1. Research Questions**

The question guiding this study was: How does the use of handheld computers by a group of baccalaureate nursing students in a Canadian pre-service program support or interfere with their ability to establish and maintain caring relationships as a key competency? Sub-questions examined within this study were:

- How do nursing students and patients describe “caring”?
- What are the nursing students’ and patients’ perceptions about the use of handheld computers in supporting or interfering with caring relationships?
- How do nursing students and patients describe the relationship of handheld computers with student learning about caring practice?

## **5.2. Context in This Case Study**

### **5.2.1. *How Caring Was Recognized***

Tarlow (1996) identified eight caring concepts that “constituted overlapping phases of the caring process: time; be there; talking; sensitivity; acting in the best interest of the other; caring as feeling; caring as doing; and reciprocity” (p. 57). Analysis of caring was based on these eight caring concepts. In addition to Tarlow’s eight caring concepts, self-care and non-caring were also examined. Self-care was included because Noddings (1984) and Watson (2006) identified it as an important component of caring. Rieman (1986), Benner and Wrubel (1989), and Noddings (1984) all discussed the concept of non-caring. Examining non-caring can help to clarify understanding of what caring is; therefore, this concept was included.

### **5.2.2. *Settings of Handheld Computer Use***

The student participants used handheld computers in the second and third years of the nursing program. The students in the study were all in their third year of the program, so all students had some experience with using a handheld computer. Students used handheld computers in acute-care clinical areas of the hospital such as surgical, medical, maternity and pediatric wards. One student also described using the handheld computer in a geographically isolated clinical placement where access to a desktop computer was limited.

### **5.2.3. *The Nursing Program***

A registered nursing diploma program was first offered by the College of New Caledonia in September of 1975 (CNC, 2009). The current four-year baccalaureate nursing program was implemented by the College in collaboration with the University of Northern British Columbia in 1997 (NCBNP, 2010). The nursing program was established following an extensive consultation and planning process that occurred over a six-year period (NCBNP, 1996). The baccalaureate nursing program was designed to address the health care needs of the northern British Columbia people, and students.

The first two years of the baccalaureate program are offered by the college, and the second two years are offered by the university.

The baccalaureate nursing program has been described as a unique and valuable program with a focus on rural and northern practice, and it is supported by collaboration among institutions, practitioners, and health service employers (NCBNP, 2010). The baccalaureate nursing program aims to prepare students for practice in a variety of settings including acute and community health care. The program also aims to prepare students for practice in rural and First Nations communities, as well as in urban centres (NCBNP, 2010).

According to the baccalaureate nursing program “[C]aring is a central and dominant feature of nursing” (CNC, 2008, p. 230). This statement about nursing is consistent with the concept of caring that was a focus of this study. The aims of the nursing program however, do not include a statement regarding caring, or a statement regarding information technology skills. This is a gap in the nursing program curriculum. The students are required to follow the CRNBC (2012b) Duty to Provide Care practice standard. This standard outlines the nurses’ obligation to provide “safe, competent, and ethical care to their clients” (CRNBC, 2012b, p. 1). In addition, nursing students are required to meet professional practice requirements as identified in CRNBC’s Nursing Competencies and Skills Required of the New Graduate (CNC, 2008). Students in the baccalaureate nursing program are expected to meet the competencies identified by CRNBC in relation to caring and use of technology. According to the Requisite Skills and Abilities document from CRNBC (2007) nurses are required to possess the ability to develop relationships and rapport with individuals and groups. The nursing program courses are discussed with the findings relevant to the course content. For example, the communication course is discussed in the findings related to the caring concept of “talking.” See Appendix A Documents for the first and second year nursing course syllabi that were examined in this study.

#### **5.2.4. *The College and the University***

The College where this study was situated has provided post-secondary education since 1969 (CNC, 2009). The College has six campuses in a region of

approximately 117,500 square kilometers, which contains a population exceeding 145,000 people (CNC, 2009). On average, 5,000 students are enrolled at the College each year (CNC, 2009). The College offers more than 50 programs in the fields of Health Sciences, Trades and Technologies, Social Services, Business, and University Transfer (CNC, 2012). The nursing program is one of seven Health Sciences programs offered by the College.

The University of Northern British Columbia (UNBC), the College's collaborative partner in the nursing program, was established in 1990 (UNBC, 2013a). UNBC enrolls just over 4,000 students, and offers 25 bachelors programs, 14 masters programs, and three doctoral programs (UNBC, 2013b). The UNBC School of Nursing offers the third and fourth year of the baccalaureate nursing program, as well as a Post-diploma Baccalaureate Nursing program, a Master of Science in Nursing, a Family Nurse Practitioner program, and a Rural Nursing certificate (UNBC, 2013c).

### **5.2.5. *The Health Region***

The nursing program and the hospital where this study was conducted are situated in the Northern Health region of British Columbia. According to the 2009-2015 Northern Health Strategic Plan, organizational values include: 1) compassion: caring genuinely, 2) treating people with respect: honouring diversity and treating people fairly, and 3) empathy: understanding and earning trust (Northern Health, 2009). Northern Health's value of "compassion" is consistent with the concept of caring.

Northern Health provides health services to approximately 300,000 people over an area of about 600,000 square kilometers in northern British Columbia, Canada (Northern Health, 2012). Northern Health is divided into three health service delivery areas: Northeast, Northern Interior, and Northwest (Northern Health, 2011). The setting for this study is situated in the Northern Interior health service delivery area. One of the largest cultural groups in this service area is First Nations people. First Nations people comprise over 13 percent of the population of the Northern Health region (Statistics Canada, 2012). While First Nations people had the opportunity to participate in this study, none of the students or patients who volunteered were First Nations people.



People within the Northern Interior health service delivery area have poorer health indicators than that of people in other areas of British Columbia (Statistics Canada, 2012). For example, there are higher rates of obesity and nicotine dependence, and greater incidences of cancer, acute myocardial infarction, and injuries. There are also higher incidences of death from all causes in people from the Northern Interior health service delivery area than among people in other health service delivery areas in British Columbia (Statistics Canada, 2012).

People in the Northern Health region also face challenges related to the labour market. For example, the rates of unemployment and income assistance for people in the Northern Health region are higher than other health regions in British Columbia (BCStats, 2011). People living in the Northern Health region also have lower levels of education in comparison to other health regions of British Columbia. For example, the Northern Health region has the highest percentage of 24- to 54-year olds without post-secondary credentials in British Columbia. In addition, in the Northern Health region, the percentage of 18-year olds who did not graduate from high school is also the highest of all the health regions in British Columbia (BCStats, 2011).

Northern Health facilities include more than two dozen hospitals, 14 long-term care facilities, many public health units, and many offices that provide specialized services (Northern Health, 2011). Northern Health provides acute (hospital) care, mental health and addictions treatment, public health, and home and community care services (Northern Health, 2011). In 2008-2009, Northern Health facilities provided 539 acute-care bed spaces and physicians performed over 35,198 surgeries (Northern Health, 2011).

This study was situated in a Northern Health acute-care hospital on a surgical unit. Participants included patients who either had surgery ( $n=3$ ), or were awaiting surgery ( $n=1$ ). The unit is divided into 6 pods and each pod has eight to ten beds. Each pod is typically staffed with one registered nurse and one licensed practical nurse. Length of stay for patients varies greatly depending on the health status of the patient. For example, some patients who have surgery for an injury and are otherwise in good health may stay for one to two days. Other patients with co-morbid conditions, such as diabetes, may stay for several months.

### 5.3. Handheld Computers Supported Caring Relationships

When asked if handheld computers support or interfere with caring relationships, students and patients stated handheld computers helped more than interfered. Students and patients commented on how using handheld computers in clinical support caring relationships:

- Student 1: It hasn't interfered. You're in the moment with the patient and you're talking about things. To get up and go and interrupt that conversation, you have to go into another room and get a manual, or look something up, you disturb that dialogue. You could look it up then and there.
- Student 2: I think it has really helped in the sense that I can talk to them [patients] more. The more you can explain to patients I think they feel like they are better cared for because you are taking time to explain things to them.
- Student 4: The biggest thing about understanding caring is understanding what they are going through, using empathy and focus. So the palm would help because you're getting all that information in your research beforehand or during.
- Patient 1: It didn't hinder. Honestly I didn't even notice it because even while he was typing it in he was telling me what he was doing. He said "I'm just going to look this up." I knew what he was doing. I think it contributed. I don't think it interfered at all.
- Patient 2: I think it's amazing. A pretty valuable tool to have right from the beginning. I felt it was a really good idea. I think the equipment is becoming more high tech that maybe it's going to free them up more. I think it would be a real asset.
- Patient 3: I think it could definitely help. It makes the job easier. It's good to see things move forward technologically. You can't stay with pen and paper forever.

Both the students and patients were able to describe how handheld computers contributed to caring relationships and did not interfere. Student 1 explained the handheld computer allowed him to stay in the moment with the patient, and he could continue his dialogue with the patient without interruption. Student 1 further explained he could look up information immediately without having to leave the patient. Patient 1 knew the student was using the handheld computer for a purpose related to her care, as

the student explained what he was looking up on the handheld computer. Patient 2 and 3 commented handheld computers were a technological advancement and made nursing easier. Clearly, the students and patients thought handheld computers contribute to the ability of the students to establish and maintain caring relationships.

### **5.3.1. Time**

#### **Caring and Time**

The concept of *time* in relation to the use of handheld computers was discussed extensively by all of the students and patients in this study. Students commented frequently about handheld computers saving them time. Students with a handheld computer stated they had more time available to provide patient care than students who did not have a handheld computer. According to students, the time they saved through the use of handheld computers allowed them to spend more time with patients practicing caring skills, such as answering questions and providing explanations for patients. Students stated that if they spent the time saved focused on patients, it would be beneficial for the patients.

Student 2: It [the handheld computer] gives me more time to spend with patients which is more important to me than spending time elsewhere. Students who have that time-saving ability can give time to patients. I can be spending a few extra minutes with them to hopefully make them feel they are important. I can take time to explain things to them. It gives them time to ask questions and you can do your best to answer them.

Student 4: It's a time saver for me, a huge time saver for everybody who used it. If you use it as the time saver that it can be, now you have time for all of the other things. You can spend that time on the patient. Wouldn't that be beneficial?

The concept of *time* in relation to the use of handheld computers was also discussed extensively by all of the patients. Patients discussed the importance of the students being able to look up information quickly so the students or nurses would have more time to spend with them. One patient said it was much quicker and easier for the student to find medication information using a handheld computer at the patients' bedside, rather than having to leave the patients to go look for information in a book.

Patient 3 stated there would be less time spent searching for information and the nurse would be more available to address patient needs. Patients 3 and 4 both stated that they would have to spend less time waiting for the nurse. Patient 4 explained how nurses might get involved in something else and forget to come back if they go out of the patients' rooms.

Patient 1: It didn't take him [the student] very long, it was just seconds. He typed in the word. If he left the room and looked it [the medication] up down at the front desk, it would have slowed it way down. It would have taken him X amount of time to walk down to where the drug book is, look it up, go through all those pages, then come back. Much quicker for him to do it that way. To me it's a lot easier.

Patient 3: Instead of having to flip through a bunch of papers to try and find something, you would type in the word that you are looking for and pull up the information you need without having to go looking everywhere for it. She [the nurse] can spend more personal time with the patient. You don't have to wait for a long time if you do need something.

Patient 4: You wouldn't be waiting a long time. Well, it's something to be treated right away. You're not leaving the patient waiting. If they [nurses] go and then they get given another job, or something else sidetracks them, it doesn't get addressed right away. They might forget to come back and handle this little problem, whatever it might be.

Both students and patients thought *time* was a critical component of caring. In order to be caring, students' time and presence were required. Students and patients stated that the time saved through use of handheld computers was important in allowing more time for patient care. For example, time that would have been spent searching for information on medications from a book that may not be available could be put to better use, and patients would spend less time waiting for care.

## **Time Management**

Time management and efficiency were identified to be important by all the students. Students who used handheld computers said they were not as worried about time management now that they had a handheld computer. All the students described the efficiency of the handheld computer:

- Student 1: It's made you more efficient, saves time looking up [medications], hiking back to the nursing station and trying to find the guide. It is such a quick reference. Bang there it is.
- Student 2: It helps me to be faster, respond faster to what my patients need regarding medications. It provides you with more time so I don't feel rushed and behind in things.
- Student 3: It is more of a technical tool that increased my time management. I am not as worried about time management in my life right now. I found this very efficient from day one. I am able to just whip it out. [I am] able to time manage a little bit better so then you have more time to spend with the patient. Even when there is no rush it is still quicker to do it that way. [Without the handheld computer] it would mean time consumption because I would either have to ask somebody or go look it up. I would have to find a different way to time manage because I would have to leave whatever I was doing.
- Student 4: Time management as a student nurse is critical. You are overwhelmed by the information that we have to understand and the things we have to do. So with having something easily accessible like your Palm in your pocket where you don't have to go looking for that book saves you that time. I can type prevacid a lot faster than I can look prevacid up in a book. It gives me that one step that I can go to before I have to ask my instructor and waste their time.

All of the students identified the positive impact handheld computers had on their ability to manage their time. The students found handheld computers enabled them to be efficient, save time, and respond in a more timely way to patients' needs. One student explained how she would be less efficient without a handheld computer.

## **Organization**

Two students and two patients identified the handheld computer can be used to assist with organization. Student 2 commented "It's hard to keep yourself organized." Some students stated they were better organized with the use of the handheld computer. One student also discussed features of the handheld computer that she used to assist her organization in clinical. For example, the student could make a list of equipment that is needed for a procedure, or she could set the handheld computer to beep and remind her when a medication is due.

Student 4: Aside from the obvious not forgetting to give this drug at this time, not forgetting to perform a procedure, the palm is great for that because you know what is coming. It lists basically what kind of things you are going to be needing or have to do; as well you could make notes for yourself. I think 90 % of the population easily could figure out how to make a note or a list, or alarm system for this, beep when this med needs to come out.

Two students commented on the merits of the handheld computer calendar function:

Student 3: It would definitely be beneficial just for appointments. I liked having it, it was good. Before that I had a little calendar, like a paper calendar that I kept in my purse and I got rid of that when I got my palm. Just to write down what shifts I worked.

Student 4: With assignments it's in constant use. I use it for scheduling work, and scheduling school exams, and when is this paper due, and when is that paper due, and how is your day planned. It's constantly in use.

Both patients and students recognized the value of the handheld computer for assisting with organization. Using these functions assisted the students with being more effective in managing their time. Patients commented that handheld computers could be used for "day planners, organizers, notes, work schedules, and school schedules" (Patients 1, 3, 4).

### **5.3.2. *Be There***

#### **Caring and Be There**

The concept of "be there" was identified by all students and two patients as an important part of caring. The students described caring as being there for the patient, being present, being mindful, and being genuinely interested in the concerns of the patient. Student 4 explained that it is important that the focus of the student should be on the patient, rather than the task, the next step, or the next patient. The patients commented that the nurse should be there for patients and asking if patients needed anything. It was also seen as important to focus on the patient, rather than focus only on the task.

- Student 1: Try to be there with them. It's about being present, being in the moment with that patient, not letting outside factors into your mind. When you walk in to the patient be there for them whole heartedly. It makes all the difference in the world. Keeping mindful instead of wandering off.
- Student 2: When I say being there, if a patient is upset about something or in tears for example, you wouldn't want to just walk away from the situation. You want to be there, and try and comfort them, and find out why they are upset. Just really listening to what their needs are.
- Student 4: To show them that right now they are our focus and that we care. Showing that for you, for them, for that moment, that's important. That's all that's on your mind. You're not thinking of your taxes or the next patient. You're not focusing on the next step you're focusing on the patient. To me that's caring for a patient. So you're focusing on doing this task correctly, but you're not focusing on just that. You can broaden your scope of where your focus is and keep it on the appropriate one. If you're giving somebody a bath and you're not talking to them, or you're off in your own world, you're thinking of your taxes or something like that, then you're not focused on the patient, you're focused on something else and you're just doing a task. So where your focus is at the time is very important.
- Patient 3: They [nurses] are able to be there. Being available if you need them.
- Patient 4: They [nurses] would be there. So they'd be kind of in and out maybe and asking you if there is anything you need.

Students stated it was important that the focus be on the patient, that the student be present, be mindful, and be in the moment to be caring. According to patients, nurses need to be available to patients and asking about the needs of patients. Both the students' physical presence with the patient and the mental focus on the patient were viewed as important parts of the concept of "be there."

### **Point-of-Care: Not at the Bedside**

While the handheld computer provided students with access to information in the clinical area, the "point-of-care" in this study was not typically at the patients' bedside. Student participants rarely used the handheld computer at the patients' bedside, which is in contrast to the comments made regarding not having to leave patients to look up

information. This may mean the handheld computer interfered with the students' ability to "be there" for patients.

The students all talked about the importance of using handheld computers before going into the patients' rooms so they would be prepared and knowledgeable when they were with patients. For example, students did not want to appear as if they did not know information about the medications they were giving and one student said that lack of knowledge would create anxiety in the patient. One student stated her focus should be on the patient rather than the handheld computer. Another student said it would be rude if she used the handheld computer in front of the patient. From this perspective, using the handheld computer prior to entering the patients' rooms supported the students' ability to "be there" for patients. Three students commented:

- Student 1: I haven't been using it that much in the room with the patient. I try not to do that in front of the patient. It shows a little more surety and knowledge. You want to come in and you want to know your stuff. You don't want to, you know, I don't know this, I don't know that. It's better to come in knowledgeable.
- Student 2: I feel if I use my handheld before I go into a room it helps me feel prepared and confident and that way I can just focus my attention my patient rather than all these distractions in between us.
- Student 4: I didn't often use it in the room with the patient unless the patient was actually wanting to see it, or we had been talking about it, or interacting about it. For me I just thought was rude in the room. I would hate to walk into a room and have to give drugs and be fumbling, and I don't know what that drug is, and I don't know how this interacts. You need to know what you are doing before you walk into that room because otherwise you just going to set the patient's anxiety through the roof.

While students did not typically use handheld computers in the patients' rooms, all of the students used handheld computers at the medication cart when preparing medications. Handheld computers facilitated students' learning as they provided access to accurate information, even though, in most cases, the point-of-care was not at the patient's bedside. Students also used handheld computers at the nursing station to help them with patient charting. Student 4 explained "I used it more at the desk with the charts." Students commented they used handheld computers in the following ways:



Student 2: I'm usually using it at the medcart when I'm flipping through the MARs [medication administration records] and preparing medications. That's when I'm using it so I feel more prepared when I go into the [patient's] room.

Student 3: If you have got those three or four patients and all of a sudden I am giving a med I am not 100 percent sure of I can quickly look it up just at the medcart and be like OK we are good.

If students are rarely using handheld computers in the patients' rooms, handheld computers may not interfere with caring relationships. The attention of the students is on the patients when they are with the patients, rather than the handheld computer. However, this reluctance to use handheld computers in front of patients may mean the students are leaving the patients' rooms to access information, which may interfere with caring relationships and the ability of students to "be there" for patients.

### **5.3.3. *Acting in the Best Interest of the Other***

#### **Promoting Well-being**

This "acting in the best interest of the other" concept was not well identified by the students or patients. Only two students and one patient made comments about caring that were consistent with the concept of acting in the best interest of the other. Patient 1 commented "To me that means he [the student] was loving. Someone who actually cares about what is going on in the world around them. Looks after people." Student 2 described caring this way: "[By] providing the best care that you can, try and comfort them, find out why they are upset." Student 2 stated that the patient will then feel that they are better cared for. This student wanted to understand what needed to be done for the patient so she could act to protect, enhance, and promote the well-being of the patient. Student 2 also described caring as "remaining free of judgment," which points to the view of caring as a moral ideal rather than a task-oriented behaviour. Student 4 also talked about acting in the best interest of the patient.

Student 4: It's putting yourself in their spot in respect to the fact you understand that they are in pain, or they are embarrassed, or they are not comfortable. You can understand that someone is hurting and what you have to do hurts them and you feel bad. You're working with them to make it as little as possible. You're going out of

your way to make sure that you just show them basic human compassion, and not being mean, I guess. You just try and make it as easy as possible.

Promoting the well-being of the patient is supported in the nursing program curriculum. Learning outcomes of the NURS 101 course, The Art and Science of Nursing, included “Begin to demonstrate and model professional behaviours as a nursing student in the profession of nursing as per CRNBC professional practice standards and the CNA Code of Ethics for Nurses” (NCBNP, 2009, p. 2). Ethical aspects of nursing were examined in the NURS 101 (NCBNP, 2009) course and content included the CRNBC professional standards, practice standards, and the CNA code of ethics (2008). As one of the methods of evaluation in this course, students are expected to write a scholarly paper addressing the art (aesthetics) of nursing, including the concepts of caring that students believe are essential in practicing nurses (NCBNP, 2009). In the nursing course NURS 204 Healing Modalities, course objectives include expectations that the students understand ethical and legal aspects of healing modalities, drug therapy, and drug administration (NCBNP, 2009).

## **Patient Safety**

Patient safety is an important example of “acting in the best interest” of patients. The most important benefit of the handheld computer, from both the students’ and patients’ perspective, is safety. The handheld computer supported students in following the “rights of medications administration,” which include the: right medication, right client (patient), right dose, right time, right route, right reason, and right documentation (CRNBC, 2013). Students used handheld computers to check safe dosages of medication and explore why the patient was receiving a particular medication. The students and patients believed handheld computers contributed to safe patient care. Students stated that by having a handheld computer available to them, they were more likely to look up a medication they were unsure of. Students used handheld computers to look up drugs rather than going ahead and possibly making a medication error. Students identified the handheld computer as a safety precaution:

Student 2: It’s just like a safety precaution just to make sure that the medication you are giving is a safe dose and you are giving it for the right reason. I like to check the safe dosages to make sure that it falls within the safe range so

it is not going to cause the patient any harm. It is easy to pick up when you have your handheld to look up safe dosages. A lot of people may not look up medications before they give it. I am finding it is really important to have my handheld computer just because it allows me to see why people are getting certain medications and I think it prevents errors from happening. It helps me to analyze the situation better. My patient has high blood pressure; this is why they're getting this medication. Just sort of connects the all the pieces together.

Student 4: You know if I mess up I'm going to kill somebody. You also know you have done all the research you can and you know that this is safe and you that this is current because you have this information. Its lifesaving basically bottom line.

One student, however, did not rely on the handheld computer alone for checking safe doses of medication. She stated that safe doses were very patient specific and the handheld computer did not have the information she needed to make a nursing judgement about how much medication to give. This student used additional sources of information to help her make decisions about safe doses of medication. She commented:

Student 3: The safe doses are a little bit iffy as far as break through pain, so I usually double check it with another nurse. I don't actually rely on my palm for that. It's very patient-specific. I don't feel it has that information in there.

Handheld computers contributed to patient safety according to patients, as well. Patients were aware that medication errors do occur and have the potential to be detrimental for patients. Patients explained that use of a handheld computer could help prevent medication errors from occurring. One patient stated that she felt reassured when the student looked up the medication and confirmed it was the correct medication. Another patient commented that students are afraid of making a medication error, and the stress experienced by students can be felt by patients.

Patient 1: So to me less chance of a mistake. Mistakes happen, things that happen in medicine, they happen everywhere. You can get the wrong drugs. He looked it up before he plugged it [IV medication] in. You could see that he wasn't sure, he looked it up. This is what it does, this is what it's for collated with what I was being treated for. I

felt reassured. If it was the wrong drug, could have been real bad.

Patient 2: I suppose in some cases it could stop a med error being made. Maybe somebody is going to give a med to somebody not realizing that it is one they are allergic to because they [medications] all have all these different names. So they [the student] could look it up right then because they would know they [the patient] can't have it or yes they can. When I was a nursing student I was scared a lot of the time. You're scared you are going to make a mistake.

Patient 4: Well the amounts [of medication] that would be appropriate to have. You wouldn't want to give somebody too much. I don't know that any mistakes are made, there are probably not. I find it amazing that everybody gets their medications and everything is right, but it would be a good way to double check.

Clearly, students and patients consider the handheld computer an important source of information that positively contributes to the safe administration of medication. Patient safety is an important component of the nursing curriculum. Safe administration of medication and medication errors are topics that are included in the NURS 204 Healing Modalities course (NCBNP, 2009) and the NURS 211 Clinical Practicum: Adult course (NCBNP, 2009). Students are introduced to medication administration, including the CRNBC (2009) practice standard for medication administration. A major portion of the NURS 211 (NCBNP, 2009) focuses on students learning and practicing administering medications in both laboratory and clinical settings. During the clinical portion of the NURS 211 (NCBNP, 2009) course, students have the opportunity to administer medications for adults under the supervision of a clinical instructor in a medical or surgical area of a local hospital. Students also have the opportunity to practice medication administration in the NURS 220 (2009) Clinical Practicum course. Learning outcomes of the NURS 220 (NCBNP, 2009) course include promoting holistic health care and demonstrating safe nursing practice. Use of handheld computers supports the course content and learning outcomes for the nursing courses NURS 204, NURS 211, and NURS 220.

### **5.3.4. *Caring as Feeling***

#### **How the Patient and Student are Feeling**

Students had a few comments about the feeling aspects of caring that focused on their personal characteristics. Students 1 and 2 described caring as “being myself” and being “supportive,” “friendly,” and “happy.” Students identified that asking the patient how they were feeling was important. In contrast to the students, patients had many comments about the concept of caring as “feeling.” In particular patients talked about the importance of being asked how they were feeling. Patient 2 was more focused on the affect of the students and how she was being addressed by the students. Both patients 2 and 3 stated a smile was important and patient 3 said the nurse should demonstrate enjoyment of the job.

Patient 1: He [the student] was very good. [He asked] how was I feeling, did I have any concerns. He definitely genuinely cared about patient care. Making sure I was comfortable.

Patient 2: It is their affect, the way they come on to you. They smile a lot and they come right in to you and then they say I’m so and so and they shake your hand and they tell you they are a student.

Patient 3: When you care for something it means something to you. Something meaningful. Showing them [patients] affection. Being nice to them. They [nurses] had a sense of humour and they were cheerful. I’d say happy, a smile on her face, like she enjoys coming in to see you to see what you need. [The nurses] had a smile on their face and looked like they enjoyed their job.

The patients talked about three aspects of caring as feeling: 1) how the patients were feeling (comfortable); how the nurse was feeling (happy and cheerful); and 3) the nurse being genuine (being nice, showing the patients affection). Patients clearly felt that the caring relationship was guided by feeling. Feelings of concern and/or affection about the person were tied to why the nurses or students cared about the patients.

#### **Confidence of the Student**

Students commented on feeling anxious when they did not know something. One student commented that when students are stressed, they are more likely to make mistakes. Patients commented that if students were stressed, the patients may feel that

and be stressed as well. The students and the patients were less stressed, more comfortable, and more reassured when students used a handheld computer, as compared to when they did not. Students and patients were more confident when students were using a handheld computer. Easily accessible accurate information may help the student feel more confident, as they do not have to rely only on their memory. For example, students stated they could rely on the handheld computer if they could not remember information about medications. Student 2 also commented that feeling confident helped her to be more caring.

Student 2: It's helped in the fact that I feel more confident with what medications I am giving and why I am giving them. I think feeling more confident and having that time allows you to practice your caring skills a little bit more and be more involved with who you are caring for.

Student 3: It makes me more confident. That's the one big thing is that I know that if I have my palm pilot that I'm less likely to draw a blank. I know that the information is there and that I just have to look it up. I can't keep all the information in my head so it is nice to have a back-up plan if I draw a blank. I feel very confident talking to a patient. Being able to talk to them and know what you are talking about which is a big thing.

Student 4: It just helped alleviate some of that stress because you had that information. When students get stressed we make mistakes and that's real bad for patients. If you panicked and you're at the med cart and you go oh my god I don't know the name of this pink pill wait what's the name of this and you go look it up right there and you're ok.

Patient 2: They [handheld computers] help to make the nursing student feel not quite so scared. [It] could help build the confidence by having this information right at hand. When students are stressed you are going to feel that as a patient. So that takes away some of the stress. You feel more comfortable if a student comes in and they appear to know or have confidence that makes you feel more confident or not as afraid. The students that are more confident they seem to be the ones that are willing to do everything and learn. They are going to be more self-assured because they have the information.

Students were much more confident giving a medication when they knew about it before going into the patients' rooms. This need for students to be knowledgeable and credible when they go into the patients' rooms may be why students rarely used their

handheld computers in the patients' rooms. Student confidence was also a concern for patients. Patients were more comfortable, confident, and reassured when the student was confident. One patient stated that confident students also learn better. However, students may not always have access to a handheld computer, for example, if the device is being used by someone else, misplaced, or stolen. One student discussed how she and another student dealt with a missing handheld computer:

Student 3: I would be very devastated if I lost it [the handheld computer]. My friend thought she lost hers so we had worked out a schedule. She would work her day and then I would get on at night so we would switch with the palm. She had misplaced hers but she found it. It was good that she found it.

Both students and patients stated that having access to the information handheld computers provided helped alleviate stress and build the students' confidence. This reliance on the handheld computer may increase student confidence; however, students need to build confidence in their own nursing knowledge base, as well. Students need to build confidence independent of the handheld computer.

### **5.3.5. *Talking***

Talking was identified by students as a part of the concept of caring and an important part of establishing and maintaining caring relationships, however only one patient commented on this concept. Students stated it was important to get to know patients by talking one-on-one, developing rapport, and listening to what patients had to say. They commented that caring was:

Student 1: Taking the time to get to know your patient, talk one-on-one, having that rapport with them and know that they see the kindness in you and they can open up to you.

Student 2: If you take the time and just sit down on a chair and talk with them for a bit I think that makes a difference. You know just talking with people and just really listening to what they have to say. Asking how they are.

Student 4: Just talking, I like to know about my patients so we talk. You're interacting with them about whatever they want. You're talking about whatever they want. Taking just an extra two minutes to talk to them and say hey how is it

going today and actually listen not just say how is it going today and then go do something.

Patient 4: Well by talking to me, introducing themselves. Most of them have done that. It's hard to remember everyone's name. Tell me what they are doing. Talking to them, that makes you feel better. The fellow [nurse] I had today was quite talkative. It takes your mind off of things. That was nice.

The patient stated that talking made her feel better and took her mind off of her concerns. The handheld computer was not identified as directly impacting talking, however, the time saved through the use of the handheld computer gave students more time to spend talking with patients. Talking was seen as an important means of establishing and maintaining caring relationships, and an important part of how caring happens. Although non-verbal communication is an important component of establishing and maintaining a relationship with patients, only one student commented on using physical touch as part of caring. Student 4 said patients find comfort in touch, such as holding patients' hands when they are anxious. This student explained that there are boundaries and limits, each patient is different, and some do not want to be touched. She stated "That touch was I care. As a nurse that hugging and the comfort is what it is about" (Student 4).

Talking as a part of caring is supported in the nursing program curriculum. The syllabus for NURS 102 Communication Theory and Practice, the communication course in the nursing program, includes talking with patients as part of interpersonal relationships and professional communication skills (NCBNP, 2008). Topics in the syllabus include theories and models of interpersonal communication, verbal and non-verbal communication, and the art of effective communication, including authentic presencing, empathy, opening space, and assertive interactions. NURS 102 (NCBNP, 2008) theory classes include discussion, reflection, and experiential exercises to assist students to understand and apply knowledge of interpersonal relationships and professional communication skills. Communication skills are viewed as fundamental in any helping relationship to facilitate the health and well-being of patients. Attitudes, values, and personal and professional philosophies are reflected in communication and affect the therapeutic nature of relationships (NCBNP, 2008).



### **5.3.6. *Caring as Doing***

Two students commented about caring as doing. The handheld computer helped students prepare for “doing” care. One student equated explaining what she was doing and why as caring. The other student also stated that explaining what she was doing to the patient was important. Handheld computers provided information that helped the students provide explanations to patients. In addition, student 4 stated that doing her job to best of her ability was caring. This student also said doing things to ensure the patient was as comfortable as possible was important. Student 4 stated being prepared for what she was doing was critical to caring.

Student 2: I can explain what I am doing and why I am doing it. It helps with caring I think.

Student 4: It would be empathy, doing your job to the best of your ability. Making the patient as comfortable as possible, whatever you do, taking your extra step to make sure that they are comfortable. You’re explaining what you’re doing. Preparation is critical, absolutely critical to caring. If you cared about the patient you would be prepared.

Patients had many comments about caring as doing. Patient 2 described a caring student as “jumping right into things, a front-runner, and willing to do everything.” Patients identified activities such as managing pain, checking medications, and bringing a blanket or a glass of water as caring. Patients described caring as:

Patient 1: Checking the medication, that was a big one. Making sure I was comfortable, making sure I was getting care. I had been moved and he [the student] came looking. It was even a bonus because he came all the way down and ended up bringing me a blanket. So that was part of caring.

Patient 3: Anything you can’t do by yourself that normally you could. I’m not used to having to rely on other people to do things for me so that makes you feel kind of helpless. If I have a need to quench my thirst then the nurse can fulfill that whereas I can’t really do that for myself. Try and make it as little pain as possible for the patient. If you’re not in pain you’re going to be more cheerful. If you’re in pain the hospital stay isn’t going to be as positive.

Patient 4: Bringing you a towel and a cloth, and asking if you want to wash up even though you are lying unmoving and don’t have the energy to do that, that is a caring thing. It is

very considerate. Maybe bringing you a glass of water, or asking if you need something, or showing you where the bell is. Oh just bringing you an extra blanket, just the little things [made me feel] cared for. By giving us medications for it [pain]. By asking us to make sure that if we need it [pain medication] to ask ahead of time. Not to let it [pain] get out of hand.

In order to be caring, the actions of the nurse or student needed to be related to the patient. Patients viewed the students and nurses as possessing caregiving skills that were utilized to care for patients. Caregiving skills included managing pain and making sure medications were correct. Handheld computers can contribute to caring by providing information about pain medications and supporting students' ability to determine if medications are correct. Caregiving skills also included providing comfort measures, such as bringing water or a warm blanket. Patient 4 described these comfort measures as the "little things." Students have an opportunity to learn and practice caregiving skills in NURS 101 The Art and Science of Nursing (NCBNP, 2009) and NURS 211 Clinical Practicum: Adult (NCBNP, 2009). Skills include personal care, managing pain, and giving medications.

### **5.3.7. Self-Care**

None of the patients, and only one student commented about the concept of self-care. Student 1 stated caring for the self was a prerequisite to caring for others. Caring for patients requires strength and energy that can be rejuvenated through self-care. This student explained:

Student 1: That care, that strength, it's like an energy. You have to take care of yourself first before you can give. You have to be careful with that to a degree because you can burn yourself out.

Self-care is included in the content of NURS 101 The Art and Science of Nursing (NCBNP, 2009), a first year nursing course in the nursing program. Articles addressing holistic self-care and overcoming burnout are included in this course syllabus. Although self-care is introduced in first year, this topic is not included in second year course syllabi. This gap may be a factor contributing to why most students did not identify self-care as an important aspect of caring. In addition, nurses must demonstrate fitness to

practice which requires nurses to maintain “physical, mental, emotional (and spiritual) well-being” (CRNBC, 2008b, p. 4). Nurses often encounter intense interpersonal and interprofessional challenges and conflicts in the workplace; therefore, they need to nurture and sustain themselves in order to provide safe competent ethical patient care (CRNBC, 2008b).

## **5.4. Handheld Computers Interfered with Caring Relationships**

### **5.4.1. *Non-caring***

Only two students commented about non-caring, while patients had many comments about this concept. Two students and two patients described non-caring as nurses or students who were not focused on the patient, not paying attention to the needs of patients, and only there to get the job done. The two students explained when “*doing*” could be viewed by the patient as non-caring. One student described this “*non-caring doing*” as only doing what is required, rather than being focused on the needs of the patient. The other student described this “*non-caring doing*” as just doing a task and not being focused on the patient. What seemed to be important was whether the focus and attention was on the patient or the task, not the task itself. If the focus was on the task, the “*doing*” was interpreted as non-caring.

Student 2: I think patients may often feel you are just in and out of the rooms, just doing what you have to do and not really listening to them and paying attention to what their needs are.

Student 4: You’re not focused on the patient, you’re focused on something else and you’re just doing a task.

Patient 3: If you don’t spend time with them [patients] it’s not really caring for them properly. If it looks like you are rushed, even though you are actually physically with them, then it’s not really quality time. If it feels like they have got to rush away to do something else, then they are just doing their duties and not really caring, I think. They [nurses] don’t really care about their job. They just go about it because it’s their job it’s what they’ve got to do.

Patient 4: They [nurses] are busy. They have got jobs to do. Somebody woke us up two days ago at 5:30 she says:

"Well I have work to do, I have work to do you know."  
Excuse me we are sleeping. She [the nurse] had an agenda and it had to be filled. Her agenda was not ours obviously. It was her agenda that was more important, getting these things done. I am sure they only have that slot of time for what has to be done. We lay for a long time awake when we could have been sleeping. That didn't feel caring. It really didn't. Plus it happened again last night. Somebody came in, our lights were all out, we were ready to go to sleep, we are relaxed. The lady next to me had to have her blood drawn. She [the patient] said "at 5 to 11 at night"? I know it has to be done but why are they doing it in the night? I know they are doing their jobs, it's just that they don't seem to have as much time to do their jobs maybe.

A lack of caring skills was also identified by patients as non-caring. One patient described non-caring nursing students as:

Patient 2: students that maybe are struggling or some of them don't have good people skills. Students who are nervous, they hang back, they are at the back. They maybe don't smile as much.

Although patient 4 shared her non-caring experiences with nurses who worked with her, this patient also saw caring as an integral quality of nursing and caring as inherent in the nursing profession. This patient commented:

Patient 4: I think they [nurses and students] would be caring anyway. They wouldn't be doing it [nursing] if they didn't care. But I think they would still care because they wouldn't be in this profession.

The student or nurse may become non-caring if the focus remains on problem-solving or instrumental thinking. For example, if the task the nurse is performing becomes more important than the patient, this is non-caring. If the student or nurse treats the patient as a type, rather than an individual, the patient is objectified as a case. However, according to patient 4, caring is resilient and can tolerate some lapses in caring behaviour. This patient described her experiences with nurses who were non-caring, and explained that they would not be in the nursing profession if they did not care about patients.

#### **5.4.2.    *Handheld Computers Are Impersonal***

Although students and patients generally believed handheld computers support caring relationships, there was concern from one student and one patient that handheld computers have the potential to interfere with caring relationships. One student and one patient stated use of the handheld computer might be impersonal. Student 1 and patient 4 went on to say:

Student 1: I would rather talk to them directly rather than be looking at the screen. It almost seems a little more impersonal using it directly in front of a patient. I would rather focus more so on the person than my handheld. I don't want to convey to a patient I'm more interested in what I'm holding in my hand than on them. It might cause a few distractions if I am looking up something while I am trying to assess them or trying to explain something. It is really definitely a useful tool to have but I still like my patient care to be one-to-one with no distractions with nothing taking away from that patient relationship. So I think it's a lot easier to develop a relationship without the technology at the bedside.

Patient 4: I think it might be impersonal. Their mindset is on the computer. It is not on the person. When the kids are on the computer they are totally into the computers they are not ... it's just impersonal. I don't know how they [students] would be using them. That probably wouldn't happen in the hospital.

The perspective of one patient echoed the feelings of a student who felt it might be impersonal to use the handheld computer in front of the patient and that it can take away from the establishment of a relationship with the patient. Both the student and the patient stated the focus of the student or nurse might be on the handheld computer, rather than the patient. On the other hand, patient 2 said that the handheld computer would not be taking attention away from her "because what they are doing is related to you." Patient 1 agreed and said "it brought the attention that he was actually being more caring by looking it up [the medication] to make sure." Another patient also stated that the use of handheld computers in the hospital probably would not be impersonal. However, if the focus is drawn away from the patient, handheld computers may interfere with caring relationships.

Students and patients also discussed the importance of the focus being on the patient rather than the handheld computer. Both patients and students stated handheld computers could interfere with the ability of the student to “be there” for the patients by pulling the focus from the patient to the handheld computer. The handheld computer was described by one student as a potential distraction that could interfere with the ability of the student to focus on the patient and “be there” for the patient.

Student 2: I don't want to convey to a patient that I'm more interested in what I am holding in my hand than on them. I want to make a patient feel that they are the focus of my attention. I don't want anything to distract me from that. It might cause a few distractions if I am looking up something while I am trying to assess them or trying to explain something.

The concept of “be there” was identified as important to caring relationships. The handheld computer was viewed as a potential distraction that would draw the focus of the student away from the patient. It was important to both students and patients for the student to be present with the patient and focused on the patient. If the student is not present with the patient, the patient may feel the student is not caring.

One student and one patient identified the notion of the caring relationship as being one-on-one. The student stated handheld computers were a useful tool, but also said it was easier to develop a relationship with the patient without technology by the bedside. The handheld computer was seen by both the students and the patient as a potential distraction that could interfere with the one-on-one interaction between them. The patient explained that the nurse might be busy on the computer rather than focusing on the patient.

Student 2: It is really definitely a useful tool to have but I still like my patient care to be one-to-one with no distractions with nothing taking away from that patient relationship. I think the way to develop a relationship with a patient [is that] they have to feel that you really care about them. It has to be a one-to-one interaction. So I think it's a lot easier to develop a relationship without the technology at the bedside.

Patient 4: To me it's a one-on-one thing. Asking you if there is anything you need. When there are people in the other

room that they could be talking with they are on the computer.

Patient 2 did not feel the handheld computer would be taking attention away from her “because what they are doing is related to you.” However, patient 4 was concerned about the handheld computer being used for purposes other than patient care activities. This patient stated the nurses’ attention could be focused on their personal interests, rather than patient care. Patient 4 commented:

Patient 4: If it were used for the right reasons it would be fine. If they were checking email on it while they were nursing; I don’t think they would do that but you don’t know do you. I forget who told me in their line of work that they had to put a stop to people checking their emails. They weren’t actually on there doing their work.

Patient 4 identified the concern that the patient would not know if the handheld computer was being used for patient care or personal purposes. This patient stated that if the handheld computer was being used for patient care it would be appropriate. This patient went on to explain that nurses should not be using the handheld computer for personal purposes such as email. In this study, one patient and one student identified that the handheld computer could be a barrier to establishing rapport. However the majority of the students and patients commented the handheld computer would support rather than interfere with caring relationships.

### **5.4.3. *Inexperience with Technology***

Some nurses who are not experienced with computers may not be comfortable with handheld computer technology. Although all the students and patients stated handheld computers were quick, efficient, and saved time that could be spent on patient care, one patient was concerned the handheld computer would not be quicker for nurses who are not familiar with technology. This patient explained:

Patient 3: I think in the future it would definitely be an asset although that depends on the nurses’ ability to use technology. If you are not comfortable with technology I could see her spending more time searching for it [information] than if she was doing it the traditional way. If they had pen and paper like traditional use, that might

be quicker for them. It [the handheld computer] could make her job harder. They would be fumbling way too much and then it might slow them down. If they don't know how to use the tool properly then they could be spending more time with that and they have got to feel that they are rushed back to that rather than spending more time with the patient. Probably worse care if it is harder for her. It's going to be harder for her to give proper care.

This patient stated the handheld computer saved time that could be spent caring for patients as long as nurses were familiar with handheld computer technology. Patient 3 was concerned that the nurses' lack of comfort with technology could result in worse patient care. Nurses who are not familiar with handheld computers may be spending time struggling with the technology and spending more time trying to learn how to use the technology which would decrease the time they have available for patient care.

### **5.5. Handheld Computers May Not Make a Difference to Caring Relationships**

While students and patients were able to identify how the handheld computer supports the caring relationship, three students and one patient were not initially sure whether the handheld computer supports caring relationships or not. Once they thought further the students and patient commented that the handheld computer helps more than interferes with caring relationships:

Student 1: I wouldn't say it's helped it. I think for me, caring is more on a spiritual level. But then access to information maybe. OK it could help in this way.

Student 2: I think it doesn't hinder. I would say it more helps than hinders. It doesn't hinder.

Student 3: I don't think it made a difference. I feel that it is more of a technical tool that increased my time management and my confidence, but I don't know about actually caring.

Patient 4: I don't think so. I wouldn't know [if the handheld interfered]. This would just help with their own education, their own access to things or ideas.



When Student 3 was asked if the handheld computer would make a difference if she was looking something up she explained “it would, it would kind of make a difference because we would be learning together. So it would help. I think it would help in the long run” (Student 3). While the majority of the comments about the handheld computer were positive, the caring concepts of reciprocity and sensitivity did not appear to be impacted by the use of handheld computers.

### **5.5.1. *Reciprocity as Part of Caring***

The handheld computer was not described as having an impact on reciprocity as part of caring. Students and patients made few comments about the concept of reciprocity. Student 1 focused on the spiritual aspect of caring. This student stated that “caring is more on a spiritual level” (Student 1). This student was interested in connecting with the spirit of the patient through the process of caring. Student 1 talked about the openness and trust of the patient and his willingness to be open with the patient. Student 1 also talked about feeling like he was holding the patient mentally and spiritually. Patient 2 explained caring in the following way, “they sort of make you feel just like they put their arms around you or something and make you feel not so afraid.” Both the student and patient recognized the need for a connection on a spiritual or emotional level. Some patients, through their trust and capacity to receive care, are able to participate in caring relationships that become transformative.

Student 1: By asking them how they feel but genuinely ask them that, not just how is your pain. It’s not an assessment, it’s an open...it’s hard to describe. It’s an openness where you’re just like holding them. I picture it like holding them and they can just totally just release and lean on you mentally, physically. It’s more mentally, spiritually. Building an understanding between your patient that they know they can confide in you and, and have confidence in you. You have to shed something and you have to shed your outer guards I think before they put their guard down and put their trust in you.

Patient 2: It’s like they sort of make you feel just like they put their arms around you or something and make you feel not so afraid. Sometimes people who are going for surgery have never had it before and they could be very afraid. If you’ve got a caring nurse they can help alleviate some of that.

One student and one patient identified connecting on the spiritual or emotional level as important to caring. Spirituality is not a major focus of any of the first and second year nursing courses. The topic of spirituality is included in NURS 204 the Healing Modalities course (NCBNP, 2009) and the NURS 102 Communication Theory and Practice course (NCBNP, 2008). Spirituality may be included in the content of other nursing courses; however, this topic is not specifically addressed in the syllabi of the other nursing courses.

### **5.5.2. Sensitivity**

The handheld computer did not appear to have an impact on the ability of students to notice the needs of patient. Sensitivity involves being sensitive to and noticing the needs of others. Although students and patients did not use the word “sensitivity” to describe caring, they talked about knowing and meeting the needs of the patient. One student talked about listening to patients so she would know their needs. Another student stated it was important to meet the needs of patients in a timely way and to advocate for patients. Two students described caring in terms of:

Student 2: Knowing what their needs are and what their wants are and trying to meet those. Just really listening to what their needs are. If they need anything I will do my best to provide them with that.

Student 4: Their needs are being met in a timely fashion. I’m listening to what they are saying they don’t have to repeat themselves, they know I’m advocating for them.

Patients also talked about the importance of their needs being anticipated, recognized and met. When asked about their needs being met, two patients commented:

Patient 3: Making sure that they [patients] have got what they need. Coming in to see you to see what you need. If you need something like a glass of water she doesn’t mind getting it. Filling needs that I could normally do by myself but I can’t do now. Making sure I am as comfortable as possible by taking away pain that they can deal with. Well taken care of.

Patient 4: It’s looking out for somebody’s needs. That makes you feel better. Maybe anticipating needs. Asking you if there

is anything you need. I'm not a button pusher. I haven't even used it [call bell] yet. You're not leaving the patient waiting for days to find out what it is that they have. Peace of mind too. The uncertainty, something's stressful. Personally I think it makes a problem bigger than it actually is. It just takes the worry away.

Both students and patients viewed that part of caring includes sensitivity, or noticing the needs of others. They recognized the importance of the nurse noticing which interventions helped. Patients stated that they would feel taken care of if the nurse recognized their needs and ensured their needs were met. Patients said the nurse should anticipate their needs and ask the patient if they needed something, rather than the patient having to ask the nurse to fulfill a need. Patients identified needs such as wanting a glass of water or being comfortable as little things; meeting these needs was easy for the patients to recognize and describe as caring behaviours. According to the Requisite Skills and Abilities document from CRNBC (2007) nurses are required to develop the ability to recognize the needs of clients. Sensitivity in terms of noticing the needs of others is not a topic that is included in the nursing program's first and second year course syllabi.

## **5.6. Student Learning and Handheld Computers**

### **5.6.1. *Information Purposes for Students***

Students valued seeking information for use in the clinical area. Using the handheld computer to "look up" information was identified repeatedly by all student and patient participants. Students described using their handheld computers for many purposes such as accessing and researching information. Patients commented that handheld computers were used to "look up information, access information, download information from your computer, and bring up data" (Patients 1, 2, 3, 4). Students had a variety of programs on their handheld computers, many that came with it and some that students had downloaded, such as Nursing Central. Many of these programs supported the patient-care purposes for which students used the handheld computer, such as looking up medications. All students had a calendar or scheduling function, as well as a drug guide, and a medical dictionary. Students also had programs that helped them

calculate safe dosages of medications. In addition, students had programs that helped them with their terminology and their charting. Students also had programs that helped them with learning about the health conditions of their patients.

### **Ease of Access to Information**

Convenience was a word used by all of the students when describing the benefits of the handheld computer. Students found the handheld computer was more convenient than books. Students commented that the handheld computer was “really handy,” “right there,” “a wonderful amazing tool,” “helpful,” and “powerful” (Students 1, 2, 3, 4). Students found the handheld computers could be carried in their pocket and were always available, unlike books. Another student stated she was a step ahead of other students who did not have a handheld computer.

Student 1: I will always have in my pocket. I used it a lot. I find more and more I am using it right then and there and pulling it out for a quick reference. There's the convenience of that and if the patient has a question you have it right there. Instead of carrying the big drug book around its way more powerful I find.

Student 2: It is easier to fit my pocket PC into my pocket than a drug guide. Just to make things easy and convenient. Information is right there at hand, instead of having to leave what I am doing and go look it up in a book. It saves me time researching things. I know how to use it. I can do things quickly. Instead of looking through books and trying to find what I need, I take out my handheld and look up the medication rather than track down a book from different pods. My experience has been you can't always necessarily find the books you're looking for on the floor.

Student 3: I sometimes feel I am a step ahead of some of the other students. If they have to look something up I have already got the information. I don't have to flip through books. If a book is missing, you're wasting time. I really don't like textbooks, so being able to look it up and just punch in what I am looking for and it comes up. I really really like that. It's really fast. Saves me carrying around my books.

Student 4: It's nice and compact in my pocket all the time. It gives me that one step that I can go to. That prep work, the palm's critical for that. Finding all the books, finding all the textbooks, the drug guides, and bringing it together, forget it. Sometimes the drug guides aren't with the drug

cart. Instead of spending 6 hours looking up information, it's right there at my hand. It certainly is a step up from a book that's for sure.

Students liked the handheld computer because of the ease of access to information. Students found access to information easy and quick with handheld computers, as the information was all in one place. One student described the handheld computer as one step to find information. The handheld computer enhanced learning in the clinical setting, as students were able to look up information at the time they needed it. Student 4 commented:

Student 4: It's just very condensed information for everything you could possibly need. It's all linked together in a nice little package. With having something easily accessible like your Palm in your pocket where you don't have to go looking for that book. You still have to research but having the information easily accessible saves you that time and that time can be better put to use in making sure that you're not rushing later on. It was a huge benefit. It made my clinical practice so much easier.

Patients explained that students can access information immediately with use of handheld computers. Patients saw this instant access to information as saving time searching for information and allowing the student to get things done in an efficient way (Patients 1, 2, 3, 4). Patient 2 pointed out the student could look up information at the patient's bedside, rather than having to leave the room and search for information in books. Patient 3 said nurses would not need to rush away to get something else done. Patient 4 stated with instant access to information her questions would get answered right away. Patients made the following comments about the efficiency of handheld computers and the rapid access to information:

Patient 1: The world at your fingertips. To me it's a lot easier. You can access information immediately if you need to. You can access just about anything you want. Anybody who is in a mobile type position should be able to access that information just as easy as anywhere else as sitting at a desk. It's pretty hard to carry a laptop. He has his blackberry right there. He doesn't have all his books to sit and flip through.

Patient 2: The information, you can access it right away. I think it saves them [students] time. You can access things about

diseases, or medications, or reactions to medications. You can do that right at the bedside rather than having to leave the room and go and search through books. That takes away from that time that you are going to spend personally with the patient. This way the information is taken from all of the books and then it's made easier to find the information. All this information right at hand might save them fifteen minutes a day and they can go and spend time with a patient that needs it.

Patient 3: They [nurses] could have access to all the information that they would normally have access to on paper. It could be quicker. That would make it more efficient I guess. Save time searching for stuff. It makes them more efficient and gives them more free time. They wouldn't have to worry about rushing away to get something else done.

Patient 4: It's instant access to information. It would be quicker to look up any subject that they don't know something about. They would be able to access it from their handheld. The positive thing would be that they would be able to answer your question right away, or solve your problem right away.

Students also recognized the importance of using current resources to inform their practice. Information accessed from the handheld computer was current, as the information on the handheld computer could be updated regularly. The information provided by the handheld computer was described as "valid, correct, current, up-to-date, newest and latest, and always relevant and accurate" (Students 1, 2, 3, 4).

Student 2: It updates regularly so you are always provided with the latest and most up-to-date information regarding medications. It is a lot easier to remain current and have the latest information. The information I have is always relevant and up-to-date. It helps you stay on top of things.

Student 4: It is the ability to have constant updates. I don't want last year's information. If I wanted that I would look in a dictionary, 2 years old. I need to know that this information is current. A lot of the programs have constant updates every time you put your computer online. It has stat alert which is handy for the new research that comes out like the articles that are published to online journals. Because things change, they are doing research all the time. It's our responsibility as nurses and nursing students for sure to understand. You need to be on top of what you are doing with your patient.

Students relied on handheld computers for information, particularly about medications. Students found handheld computers were an effective and convenient tool for accessing information. Handheld computers facilitated students' learning as they provided readily available access to information in the clinical setting. Patients also described handheld computers positively, using many of the same words the students identified.

Students and patients valued quick and efficient access to accurate up-to-date information. Having electronic access to information assisted students to overcome barriers of accessibility created by time restraints and freed up time that could be spent with patient care. Students could look up information immediately without having to leave the patient or task to go look for a source of information. The handheld computer was viewed as a source of information that is easier to access in a timely manner than books or asking someone. Students commented that it is difficult and time consuming to find a book in the clinical area.

### **Looking up Medications**

Students and patients identified that the most frequent use of the handheld computer was for looking up medications from a downloaded drug guide on the device. Students stated handheld computers improved their knowledge regarding pharmacology. Information students looked up regarding medications included drug names (generic names, trade names), drug classifications, drug actions, drug uses, safe dosages, drug interactions and reactions, contraindications, and side effects.

Student 1: I use it more when things come up, when I run into any new drugs. Or a drug I've seen before but I'm not quite remembering it. I just click a little reference. Contraindications and side effects.

Student 2: I use it mostly to look up drugs and medications that my patients are on. You can search the different drug names. I just type in what drug you are wanting to research and it comes up with a list and it gives you the generic names and the trade names. What we are finding they are most useful for is what the drugs are, and the safe doses, and classifications, and reactions with other medications.

Student 3: I use it mostly for drugs. I used it a lot in medicine as well to look up the different, so many different blood pressure medications.

Patients also commented about the handheld computer being used for looking up information about medications. Patient 2 said the handheld computer was used to “access medications, reactions to medications, what they are used for, and what the side effects are.” Another patient commented:

Patient 1: He actually was looking up the medication. I asked him what are you using and he said that’s what he was doing. He actually looked up the medication I was on to see exactly what it did, what it was for. Personally if it had been me knowing what I was being treated with and everything else I was kind of a research buff so, I probably would have went and looked up more you know the different things to do with the medications, the complications. I don’t know if he did or not.

Patient 4: So that might be something she’d [the student] want to look up. You know, what would be the best medication for this particular person. For example, this person has diabetes maybe she shouldn’t be having this [medication]. So it might be something she could cross reference.

According to Patient 4, students could look up information on their handheld computer, such as “any subject, medication, pain meds, medication portions, and alternate medications.” Both students and patients found handheld computers provided important information regarding medications. Students used handheld computers most often for this purpose.

### **Looking up Definitions, Terminology, and Diagnoses**

Students and patients identified the handheld computer was used for accessing information to assist them with learning about disease processes, symptoms, diagnoses, and patient assessment. Students also identified they used the handheld computer to help them with accurate charting. In addition to a drug guide program, students used handheld computer programs, such as a laboratory guide and a medical text, to access information while in the clinical area. Students looked up information including “disease processes, symptoms, diagnoses, types of surgeries, definitions, and correct spelling of medical terminology” (Student 1, 2, 3, 4). Student 3 also discussed using the handheld computer for “patient assessment.” In addition students used the handheld computer for understanding lab results.



- Student 1: I use that [Tabers] for diagnoses and different words I am not sure of, so I look it up, medical terminology. We are doing a lot of notes and I like to spell things right because it's a legal document. If I have a question I just quickly look it up it will tell me if it is right or wrong, so I really like that.
- Student 3: Finding out different processes in the diseases. It was a diagnosis and none of the nurses on the floor knew what it was. I just punched it into my palm pilot and it gave me a whole description of what it is, and what the treatment was for it, the length of stay in the hospital for it. I have used the dictionary a couple of times too for looking up definitions for things if I don't know. Sometimes abbreviations.
- Student 4: To look up diseases because we were just learning them at the time. When you're researching your patient the different diagnoses you might not as a student not necessarily know part of the complex diagnosis. You don't have that information yet. That was important to have. Find out what a lab value was because we were being expected to understand how that interacted. You understand your lab values better and what you should be looking for. Understanding what a high calcium level or a low iron level actually means for this particular patient and this particular disease and why we should expect it or worry about it, it's right there. Making sure you're charting spelling is correct.

One patient described using the handheld computer as “a learning tool” (Patient 1). Patients pointed out the handheld computer could be used to look up “definitions, health issues, different conditions, diseases, and symptoms” (Patients 1, 2, 4). Students found handheld computers assisted them in finding information regarding the health status of patients, such as diagnoses and lab values. Information provided by handheld computers regarding medical terminology was also important to students and assisted students to chart accurately.

#### **5.6.2. *Nursing Knowledge and the Handheld Computer***

Handheld computers provided students with information they needed to develop their nursing knowledge in order to provide safe competent care for patients. Two students explained how they become overwhelmed with the amount of information they are expected to know. Students recognized the impossibility of memorizing information

about every medication or symptom. Students liked the ability to look up medications repeatedly using the handheld computer which helped them learn information about medications, for example. Students also talked about how their learning was more in-depth than just memorizing the name of a medication. For example, students also learned about what the medication was used for, why the patient was receiving the medication, and interactions with other medications. When describing how the handheld computer contributed to their learning, students further commented:

- Student 1: If someone is talking about medicines I look them up and try and get myself familiar with them. If I go for a med name enough times and a classification enough times it's going to start sticking after a while. It's a repetitive looking up of a word like Salbutamol. What is that, what is the other one word, so I'll just plug it in. It's more in depth than just memorizing the name. I'll look up what it's for and it kind of sticks in my head, the theory in behind it. Or a drug I've seen before but I'm not quite remembering it. Again like Salbutamol what's that – Ventolin, right. I was forgetting that so I looked it up and now it's in the head. Starting to stick. I don't think you're going to memorize all the drugs out there.
- Student 2: There are a lot of medications and I am not familiar with very many of them. I need to look them up consistently and remind myself of what they do. It is really handy to have it to confirm because there are lots of drug names and it is almost impossible to become familiar with every single drug and every single name. After you look up drugs frequently enough it starts to sink in what the drug is and helps me to become more familiar with the more common drugs that are given. I found that it kind of helps me learn and process things a little bit better and become more familiar with what I am giving.
- Student 3: I can get overwhelmed easily. I know that the information is there and that I just have to look it up. I can't keep all the information in my head. I think it gives more of an overall picture. You are not just looking at the symptoms you actually know what is going on. When you are big on knowing what I am giving to patients, and just knowing if that is the right dose too, because I am just new in my practice so I don't know. I have not memorized a lot of those things. So, just being able to check it up. And sometimes because you can look up why they would be getting this so you can see why they are getting this antibiotic is going to actually help with what organism we are trying to destroy. So I just know why too.

Student 4: You are overwhelmed by the information that we have to understand. When you have a little brain issue and you can't remember why I should be concerned, what will a high calcium show up as, it's all there. If you don't know what lab value is or you don't quite understand what that means, or how that drug can track with this one or what else does it interact with, which is information you get directly from books, or other things, or your palm. That's how you learn. You're learning to bring things together in the easiest way that I knew how and for me it worked well.

Students are expected to come to the clinical area prepared with knowledge regarding the patients for whom they will care. Students used the handheld computer to research information about their assigned patients' health conditions and plans of care. Students stated the handheld computer helped them develop their nursing knowledge base, and be prepared to provide informed patient care. Student 3 commented "I like to know what's going on." Student 1 explained that he did his preparation the night before clinical using his home computer, then used his handheld computer in the clinical area when providing patient care. Student 4 described how the handheld computer assisted her with researching patient care:

Student 4: You have to have that initial knowledge base otherwise you're going to be scared. When you research it, and research it thoroughly, the palm is certainly a tool to help that. You have done all the research you can and you know that this is safe and that this is current because you have this information. Its only information helped me get through it. I knew what drugs they [patients] were on through research from the palm. The palm would help because you're getting that all that information from it in your research.

Patients also commented about how the handheld computer can contribute to the knowledge of the student or nurse. Patients recognized students and nurses have a large body of knowledge. Patients also were clear they did not expect nurses or students to know everything, or to be able to memorize everything. The handheld computer:

Patient 1: Made him more knowledgeable about what I was going through. I am sure you can't memorize every drug out there. You had the opportunity to look up something right

away when it was put in your face, like the drug he was giving me. When you got home from school after 12 hours of being at the hospital would you want to go open up a bunch of books and look the stuff up? No. But if you had the 20 minutes at work, why not. Look it up and then you are learning at the same time. It will actually make it sink in better too, doing it right then.

Patient 2: The information scrolls up for them and then OK yes I can see how that is done and maybe even learn from it. Not having to go and study the book but to actually see it there, and then maybe watch it, and then be able to do it. Because they are going to look it up right now. They are not going to be having notes, and maybe at night when they go home, and having to pour over a book to find a couple of answers. I think if it is something that is in front of you and then you are seeing it, that stays with you more than if you are 6 hours down the road and you are trying to look it up and figure it out. They [handheld computers] make the student feel more knowledgeable. It gives them the knowledge at hand. In helping the students to learn things that they need to learn and to be able to look up what they need to look up and to be able to share information with the patient maybe share it with colleagues, with their instructors. Sometimes students pick up on things the instructors have missed. You get inquisitive students.

Patient 3: Well if they [nurses] know what they are talking about they don't have to feel like they are fumbling around if they are asked a question. With knowledge they can assess the situation better, quicker. Then they feel more confident in their job because they don't feel like they are questioning themselves as to whether they are doing it right or not. If you don't know something you look it up so you can have the knowledge of how it works. If she doesn't know how to use her tools [handheld computer] it would make her look less competent on the job.

Patient 4: They would definitely be caring because they would be trying to learn a situation better. We don't expect people to know everything. There are things they could look up. This [the handheld computer] would just help with their [students] own education, their own access to things or ideas. She'd be able to help diagnose a problem. They would be trying to learn a situation better.

Patients described how the students' ability to look something up immediately on handheld computers helped students learn better. Students would not have to wait until hours later when they were home to look something up, students could learn in the moment. One patient also pointed out students could share information with others,

such as patients, other students, and instructors. Another patient explained handheld computers enable nurses to look up information that help them gain knowledge and be more confident in their job. Patients and students stated handheld computers contributed to the students' nursing knowledge.

### **5.6.3. *Nursing Practice and the Handheld Computer***

Handheld computers were also an asset to the students' nursing practice. Student 1 commented "It's totally helped, totally helped my practice." Student 3 and 4 described how the handheld computer made their clinical practice easier. One student talked about how the handheld computer helped her assess the patient and see the overall picture. The information on the handheld computer was considered a compilation of what the students had learned. One student also described how the current information accessed from the handheld computer enabled her practice to be current as well. Access to current, research-informed evidence was thought to increase the quality of patient care.

Student 3: I am new in my practice. I want to know more information, not just about the symptoms, not just about the pain. It [the handheld computer] was part of the nursing process, just finding out the overall picture of what is going on. I want to be able to assess the patient.

Student 4: It made my clinical practice so much easier. It's more like a compilation of everything that we've learned. It's information we have to do for our practice, we are learning how to be nurses and that's setting the stage for later. Your practice is current, why wouldn't your information be current. For me it's giving the patient the absolute best care that I can based on the best information I can find. It's like having all the researchers that are publishing right now their information right at my hands. I think that increases patient care amazingly.

One student also talked about how the information she accessed through the handheld computer supported her decision-making about what medication she should give to a patient. She explained how the information she obtained from the handheld computer helped her to understand the patient condition comprehensively and make decisions about patient care based on accurate information. The information assisted her to give the right medication for the right reason. For example, if the patient was in

pain, the nursing student should give an analgesic, such as dilaudid. This student said the information available on the handheld computer helped her to better analyze the situation.

Student 2: Say I was giving dilauded for example, and I didn't know what it was for. I would look it up and it would tell me that it was an analgesic for moderate to severe pain. So I would be able to say, OK my patient is having pain, this is a good medication to give them. Or if it was an antihypertensive for example, and I didn't know what that drug did. It helps me to analyze the situation better. My patient has high blood pressure; this is why they're getting this medication. Just connects all the pieces together. This is what it's for so it helps you to connect why a certain patient is receiving the medication knowing the classification. You want to look through the prns and your patient has nausea, or pain, or itching. You need to determine what the right drug to give is. You can look it up and determine this drug is an antiemetic, this drug is an analgesic, this drug is for pruritis. It is really handy to find what drug is in what classification so it helps you to choose what drug is the right drug to give for this situation.

Student 2 also described an incident where a student who did not have access to a handheld computer was guessing what medication she should give, rather than making an informed decision. If the registered nurse had not intervened, this other student may not have made an appropriate decision and may not have given the patient the correct medication.

Student 2: There was one student she wanted to give out a drug for nausea. Her patient was feeling quite nauseated and she was wanting to give out dilauded. The RN was going "are you sure you want to give out dilauded?" And she was going "oh I didn't mean dilauded" and she named another pain medication. Do you really know what you're giving your patient?

Students who had access to medication information on handheld computers made informed decisions, and were able to follow the rights of medication administration, which contributed to safe appropriate patient care. These findings support the value of the handheld computer being an effective tool for accessing information, supporting development of nursing knowledge, and facilitating students'

decision-making. The handheld computer provides much of the scientific information students need in order to make evidence-informed decisions about patient care. Students recognized the need to have access to current accurate resources in the clinical area, and valued the ability to use the handheld computer to seek information for use in the clinical area.

#### **5.6.4. *Technical Support and the Handheld Computer***

##### **Learning about the Handheld Computer**

The handheld computers the students used were either a “Palm Pilot” or an “HP Pocket PC.” While the specific equipment the student participants used when the study data was collected is now outdated, the study findings were not focused on the equipment, but rather on how handheld computers were used by nursing students in providing care for patients. Students heard about the handheld computer from a variety of sources, such as nursing instructors, other students, information technology staff, and other health care professionals. Student 1 first heard about handheld computers from a doctor. “He was going on and on about this Palm Pilot. That was the first time I heard about such devices” (Student 1). When Student 3 was in first year of the program, she heard through other students that everyone had to have a Palm Pilot. Two students commented their instructors said handheld computers were good to have (Student 3, 4). Student 2 commented:

Student 2: I heard good things about it actually. We had someone here from the college who came around to the different classes and was talking about all the different handheld computers and he really recommended the HP. A really good brand name and he found that out of all the different types it seemed to have the least amount of problems with it. Being not very technical I needed something easy and not breaking down. I wouldn't have known what a palm pilot or a pocket PC or anything was prior to that. That for me sort of swayed me into leaning toward purchasing one, that someone took the time to come around and what this did, and what you could use it for, and how it could help you in your practice.

These students found it helpful to hear about the usefulness of having a handheld computer from college instructors or an employee from the information

technology department. One student stated the handheld computer was something every student should have, while another student said students need to have a choice of whether to use a handheld computer or not. Two students pointed out technology is part of nursing.

- Student 1: I don't think we are quite there yet with the palm, that everyone needs one. I think they [instructors] could definitely discuss it, talk about what it will do, the pluses and minuses, and still give the students the option to choose.
- Student 2: It would be helpful for a lot of students to have that time saving ability and just to feel confident and know what drug they are giving when other resources may not be available to them. I think it would be beneficial to have. Things are changing and technology is part of everything.
- Student 3: The people that didn't get it [a handheld computer] would say "Oh you have a palm can I use it." So I think it was beneficial that I had one.
- Student 4: I personally think it is something every student nurse should have because it helps in the classroom as well. But you can't force someone to buy books so how are you going to force someone to buy electronics. I am of the opinion that people are hiding their head in the sand if they think that there is not going to be technology in every aspect of the nursing program.

In addition, some students may not want to use the handheld computer due to their dislike of technology. Student 4 discussed that some students believe technology is not part of nursing and are not in favour of electronic devices. She explained that some students love technology and use it all the time and some students hate technology and would never use it. During the recruitment stage of this study, some students cited their dislike of electronic devices as a reason why they did not have a handheld computer.

- Student 4: It is new technology, and for some people, intimidating and scary. You do get reluctance because nursing is about people, it is not about electronics. I have heard that a lot with the lab, the powercharting. It [nursing] is though, it is going to be. You can be fighting people who don't like technology. Technology tends to either scare people or excite people. They either accept it or absolutely hate it.



## Learning How to Use a Handheld Computer

Students found it easy to learn how to use the handheld computer. Students described the handheld computer as “easy, intuitive, dummy-proof, self-explanatory, straight forward, user-friendly, simple to use, and simple to understand” (Students 1, 2, 3, 4). Students used the phrase “play with it” when describing how they learned how to use the handheld computer.

Student 1: I started grabbing one of my peer’s palms and I started really liking it. I caught on really fast. Just start playing with it. Then I would go to the site and see what they say about it.

Student 4: The learning curve for the program itself is very, very nice. It’s really simple to use once you play with it. I’m playing with the program and learning it that way. The palm programs, or the HP programs, its similar, learn how to use the program by playing with it. Going through and trying to do something with it, that didn’t work so try something else.

Patients stated it was important for the students to learn how to use handheld computers. Patients also stated the students would not have any problems with learning how to use a handheld computer. Patients made the following comments about students:

Patient 2: Well when you go into a program somewhere down the road maybe when they go to the bookstore they pick up 10 books plus they have to get one of those [handheld computer] because that is part of what they need for their equipment.

Patient 3: Generally younger people have a fairly good understanding of how computers work and they can learn fairly good.

However, one patient had a concern about those who have been nursing for a long time. He stated nurses with many years of practice would have difficulty learning how to use the handheld computer.

Patient 3: Trying to retrain nurses that have been doing nursing for 20 or 30 years or whatever might be more difficult. Basically some people just don’t understand computers, how they work, and hardly use them. She [the nurse]

could probably eventually learn how to use it but may not be able to use it efficiently as somebody who is more comfortable with it.

Most students and patients said students could easily learn how to use the handheld computer and students should use this technology in the clinical area. However one student commented using a handheld computer should be the choice of the student. Patient 3 said nurses who were not comfortable with technology or those who were older and had been nursing for many years might find the handheld computer difficult to learn how to use.

### **Need for Technical Support**

Students stated they did not need technological support and they could figure out how to use the handheld computer for themselves. Three students stated it was not necessary for the college to provide them with technical support for their handheld computers. Students also discussed how they could access help with the handheld computer if they needed to. Students said they could figure out how to use the handheld computer for themselves by using the instruction manual, using phone in help, finding online chat sites, or using online tutorials for help with using the handheld computer.

Student 1: I know on the website they said they have support but I just find that cumbersome. I will figure it out for myself. I think that people who pick up a palm have a little ability to teach themselves and if they're brave enough step into that world I don't know how much help they are going to need. I may need advice on uploading these programs or updates but it's not really help. I just need to take time and read it. I will go on the computer and just Google it there are lots of people talking about it. Find chat sites where people are talking about it.

Student 2: I really haven't needed a whole lot of technical support with it. It's just basically the instruction manual you it tells you what you need to know and I haven't had any problems with it where I would need technical support. I think it would have probably have made things a lot quicker with figuring out how to use it you know, but I think if I knew who to contact it would speed things up a little bit and I would become more familiar with it.

Student 3: I'll work it out or I will find information to help me to use it more efficiently. I just figured it out. I have not had any difficulty. I am pretty sure I read the directions. I

am a big directions person. Same with downloading the program as well, it is step by step on the internet.

Student 4: There are many sites with phone-in tech support so you can get access to that information right away. Everything was online, or email, or through a chat program, or phone. You tell them your problem and they just walk you through it step by step how to fix it. If I don't understand something then I'll use the tutorial.

While these students did not identify the need for technical support, this may not be the case for all students, particularly students who are not currently using a handheld computer or those who are not comfortable with technology. Two students said technological support for using handheld technology in the nursing program provided by the college was necessary. They also commented on the need for a technology course:

Student 2: If you are like me don't know how to use it [the handheld computer] you need extra classes. I was thinking something like a technology course. Not even a full course but just a few sessions to introduce people to the new technology related to your practice and handheld computers could be part of that. Just going over the most common technologies, keeping up-to-date with how technology can help your practice, and extending that to handheld computers and how they can help you as well.

Student 4: There are quite a few people in my class that are not computer literate. They do not understand computers. They don't want to learn about computers. I'd add a computer class into the first term. First year I'd make sure that everybody had to have computers 101. Then you can throw in the palm.

Patients commented on the help that students and nurses would require when learning how to use a handheld computer and some of the challenges. Patients stated access to technical support for the handheld computer was necessary in the form of online or phone-in support. While the nursing curriculum did not include an informatics course, nursing informatics was a topic included in one of the first year nursing courses (NURS 101, 2009). Technological assistance with handheld computers was not provided by the college for students.

Patient 3: That depends on the nurses' ability to use technology too. Not everybody can be as fluent with technology as some people. I guess a knowledgeable person or a place they can call so if they do have questions about how the

system works then they could get them answered quickly. And they don't have to worry about searching for themselves.

Patient 4: They [students] are fast learners. I would need a course. They probably wouldn't need a course. They probably catch on especially if they have used a computer before I would think. Well they should probably have the number. The computers have the number that you can call to help you on-line. So I would imagine that there is a number they could call. I do think it would be helpful.

While students did not identify the need for technological support provided by the college for themselves, some students and patients stated it was important to have access to help, such as a number to call or on-line help. Students all identified a variety of sources for help that was available to assist them with any problems they had with their handheld computers. Although none of the patients mentioned an informatics course, two students said that the college should provide students with a course that includes information about handheld computers.

## **5.7. Challenges of Handheld Computers**

### **5.7.1. *Under-Utilization of the Handheld Computer***

#### **Functionality**

Some students made comments regarding how they could be using the functionality of the handheld computer more fully. Students explained:

Student 1: It is a very powerful tool that I'm not even utilizing. I'm probably not even touching the surface of this machine. I'm happy it's doing everything I need it to do. There may be things out there that I am missing out on. I know Outlook I'm sure that's a really powerful feature and synching I might move off of that sooner or later. I'll start using the features and I'll start probing more with it.

Student 2: I have tried to use it for the internet a few times but I can't get it set up quite right. Once I play with it a little more it will be good for emailing and researching and everything. I would have to do more research and look into what else I could get for it and hopefully find some more uses for it.

Use of technology does not automatically improve student learning. While looking up journals online is an important function of the handheld computer, not all students were using this feature. For example, student 3 said she had: "online access to medical journals. I don't use that." Looking up journal articles online via the handheld computer more consistently could assist students with integrating current research into practice settings. Students have been introduced to research in the nursing program and some have taken a statistics course, however students have not taken a nursing research course yet as this course is offered in fourth year of the nursing program.

### **Patient Teaching**

Two students used the handheld computer for patient teaching. Three patients stated the handheld computer could be helpful for patient teaching. It appears that patients would welcome nursing students using the handheld computer for patient teaching; however, in this study, this purpose seemed to be underutilized by nursing students. Two students commented:

- Student 1: If the patient has a question you have it right there. Family members will ask things right in the room. You have to be able to answer their questions as best as you can.
- Student 4: He [a patient] asked all sorts of questions so I could sit there and learn with him and teach, which was what so cool about it. The palm was good for him because he understood computers because he was a little bit younger. He was familiar with computers. He knows it wasn't a threatening thing. I had explained what I was using it for so he was receptive to it. He was interested in what I thought and it gave me a non-biased way of explaining information.

Two students described situations where they would use the handheld computer for patient teaching. This use was driven by the patient asking questions, rather than the students using the function proactively.

- Student 2: If the patient says, "oh, what is this for"? You know if they were saying "oh you know you have one of those can you show me" I would show them how I use it and what I use it for. I would show them what I am doing, how I am finding the information.

Student 3: I am sure if the opportunity came up and they [patients] were wanting to know something I would use it definitely. We would be learning together. It would be something that I wouldn't exactly know so I would be looking it up and they wouldn't know because they are asking me. So it would be something where we would have a learning experience together. And then we would both know the information.

Two patients commented the handheld computer could help students share information with the patients when they have questions. The student can address questions the patients ask and explain what they are going to be doing with the patient, procedures, or surgery for example:

Patient 2: They [students] have got the information right at hand to share with the patients as well. The patient might be quite ill you know, have questions or get very nervous because they are going for surgery. Well with that information they can access it right now and talk to the patient about it. Answer questions. They can explain the different things, like whatever is going to happen to them [the patients]. It would help.

Patient 4: By explaining what they [nurses] are doing ahead of time so that you know, prepare you for what is coming up, telling you ahead of time. Tell me what they are doing. They would be able to answer your question right away or solve your problem right away.

Students and patients recognized the value of using handheld computers for patient teaching; however, students rarely used handheld computers for this purpose. Patient teaching is an effective way for students to develop their nursing knowledge, improve the understanding of patients, and demonstrate caring toward patients. Students can also help decrease the fear and anxiety experienced by patients through the use of the handheld computer for patient teaching.

### **5.7.2. Cost of the Handheld Computer**

Although the students who participated in this study already owned their own handheld computers, they identified cost as a barrier to the use of a handheld computer. Student 1 explained the handheld computer and the programs are "just over 500 dollars

for everything” and “a lot of people don’t want to spend the money for it. It’s a pretty big financial commitment.” Two students commented:

Student 3: Money was the major reason or they [students] didn’t feel it would be beneficial for the money that it cost. It [nursing central] is quite an expensive program. A lot of us asked for it for Christmas. That is how I got mine.

Student 4: They [handheld computers] are just costly \$200 to \$400 outlay initially and the programs themselves are about another \$150. It is expensive. For somebody on financial assistance or something like that this would be a very hard tool to get.

Students identified college support for affordable handheld technology as an important approach for promoting the use of handheld computers by students in the nursing program. Students suggested:

Student 2: It would be something that the nursing program could support. In a perfect world there would be funding so that students could purchase the handheld computer.

Student 3: We were going to get together and buy Nursing Central as a bulk and it would be cheaper. So maybe something like that where we could just download it. Maybe just lowering the price.

Student 4: If the school had brought them in it would be cheaper but our school hasn’t taken part in that yet so they [students] are paying full price for them.

Patients agreed with the students that handheld computers are expensive and stated students should receive financial assistance with the purchase. Patients had the following comments about the value of handheld computers and how the barrier of cost could be addressed:

Patient 1: I definitely think it [the handheld computer] should be part of the nursing program. Just give it to them. Well at least provide them with a cheaper form of it and some kind of support so that it’s there with them all the time.

Patient 2: I think they [handheld computers] are fairly expensive. I guess if they bought them by bulk they would be cheaper. Maybe it is going to become a part of the books you have to purchase when you begin the program.

Patient 3: They [handheld computers] are not cheap to buy.  
Definitely if it is a requirement for the course I think if it  
was subsidized it would be good.

The three patients' comments were consistent with what the students said regarding the cost of handheld computers, and the need for the college to support affordable handheld technology. Currently, the college book store does not offer handheld computers or programs at a discounted rate, nor is funding available for students to purchase a handheld computer.

### **5.7.3. *Lack of Policy and Program Aims for Handheld Computer Use***

#### **The Hospital**

The *Decision Support Tool: Social Media Policy* is the only Northern Health policy relating to the use of handheld computers by nurses (Northern Health, 2010). The social media policy of the hospital in which this study was located has been in place since November 1, 2010 (Northern Health, 2010). This policy was not in place when the data for the study was collected, however the policy does have an impact on the current use of handheld computers. Policy guidelines regarding the use of social media include: "Devices are not to be used in areas where patients are receiving service; Devices are not to be used while staff are providing service to public or clients" (Northern Health, 2010, p. 2).

The functions of the handheld computer related to nursing practice, such as looking up medications are not addressed in this policy. Instead, this policy focuses on personal use of social media. As it is sometimes difficult to differentiate between personal and work use of a handheld computer; this policy has the potential to interfere with work-related use of handheld computers. For example, a student using a handheld computer program to look up a medication in the presence of a patient may be viewed as using the device for personal use rather than for legitimate nursing practice.

#### **The Nursing Program**

CNC does not have a policy relating to student use of handheld computers, although work is being done to establish a social media policy. Use of handheld



computers by students for learning purposes in nursing practice settings are expected to be included in the college social media policy. The nursing program includes guidelines for the use of social media in its student handbook (NCBNP, 2011). These social media guidelines were not in place when the data for this study was collected. The following are the social media guidelines from the nursing program student handbook:

- Nursing students have an ethical and legal responsibility to maintain patients' confidentiality
- Inappropriate use of social media can result in harm to the profession, including breaches of confidentiality
- Breaching confidentiality erodes the patients' trust of the nursing profession
- Inappropriate use of social media can cause harm to patients, peers, your nursing education, and future employment
- Once information is online it is difficult to remove and it has extensive accessibility and can have unintended consequences
- A power imbalance exists between nurses and patients and inappropriate use of social media can result in violation of nurse-patient boundaries and patient exploitation (NCBNP, 2011, p. 30)

The nursing school social media guidelines do not mention handheld computers specifically; however, these guidelines could be applied to the use of handheld computers. These guidelines, like the hospital's social media policy, could have the potential to interfere with work-related use of handheld computers in the presence of patients. It would be difficult for an observer to know if a student was using a handheld computer for a legitimate nursing practice related purpose or for personal use. The applicability of these guidelines to the use of handheld computers by students in the practice setting needs to be made clear.

Although the baccalaureate nursing program statement about nursing says "[C]aring is a central and dominant feature of nursing" (CNC, 2008, p. 230), the aims of the nursing program do not include a statement regarding caring or a statement regarding information technology skills. This is a gap in the nursing program curriculum. The addition of aims regarding caring and information technology skills would provide clear direction for nursing program curriculum development, faculty, and expectations of students and graduates.

## 5.8. Conclusion

Both patients and students identified concerns related to the use of handheld computers. One patient stated that nurses who were not comfortable with technology might have difficulty using a handheld computer and would have less time for patient care. However most students said it was easy to learn how to use the handheld computer and did not think it was necessary for the college to provide technical support. Another concern on the part of both patients and students was that handheld computers could take the focus away from the patient.

However, both students and patients stated handheld computers were an effective tool for accessing information and facilitating student learning by providing much of the scientific information they needed to make decisions and judgments about patient care. In addition, handheld computers positively contributed to safe administration of medications, and the confidence of students. The point-of-care where handheld computers were used was not typically at the patient's bedside: students used handheld computers most frequently at the medication cart when they were preparing to administer medications. This use may be related to the students' desire to be knowledgeable when they came in to the patients' rooms to provide care.

Caring was described in terms of concepts such as "time" and "be there," among others. Patients had many comments regarding "non-caring"; however among both patients and nursing students, "caring" was viewed as an integral quality of nurses, and "caring" as inherent in the nursing profession. Handheld computers were described by participants as fast, efficient and a timesaver. Students and patients said that the time saved through use of handheld computers allowed them to have more time to practice their caring skills with patients. Students and patients stated the use of handheld computers supported more than interfered with baccalaureate nursing students' ability to establish and maintain caring relationships as a key competency.

## **Chapter 6.**

### **Conclusion**

This chapter includes a discussion of the relationship that handheld technology had with the ability of nursing students to establish and maintain caring relationships with patients. The research purpose, research questions, the case study approach, and how caring is recognized are briefly described to remind the reader. The study findings are compared and contrasted with the literature. Lessons learned and the limitations of the study are discussed. Recommendations for the baccalaureate nursing program and for future research are outlined.

Entry-level registered nurses are expected to provide a caring environment for patients, to possess basic computer literacy, and to be aware of ICT. Caring competencies require that the registered nurse “establishes and maintains a caring environment that supports clients to achieve optimal health outcomes, goals to manage illness or a peaceful death” (CNO, 2008, p. 14). As well as providing a caring environment, nurses are expected to understand and utilize technologies that “change, enhance or support nursing practice” (CNO, 2008, p. 8). However, in spite of this requirement, Hebda and Calderone (2010) pointed out nurses and nursing faculty lag behind in informatics skills. From the viewpoint of Honey, Carr, Irvine, and Westbooke (2010) technology has become a significant part of nursing practice, so it is essential for nurses to articulate how technology can support nursing practice.

Interest in this study was initiated by a handheld technology project at the college where this study took place. Outcomes from this initial project indicated handheld computer technology supported student learning in the clinical area by providing information to make informed judgments about patient care. Furthermore, the contradictory findings in the literature were intriguing. Some view the handheld computer as an amazing technological advancement that is of benefit for patient care

(Altmann & Brady, 2005; Farrell & Rose, 2008; Koeniger-Donohue, 2008; Wu & Lai, 2009). Others view the handheld computer as one more piece of technology that is a detriment to caring and can endanger nursing care of patients (Hjalmarsson, 2009; Kerr & Sirontnik, 1997; Thomasma, 1994). Cornelius (2005) identified the handheld computer could be a barrier to the nurse-patient interaction. She found in her study that the handheld computer interfered with the ability of about two-thirds of the nursing students to establish rapport (Cornelius, 2005). In a society enamoured with the market-place economy and the siren call of technology, the concept of caring within nursing practice may be endangered.

## **6.1. Research Purpose and Questions**

As identified in the introduction to this study, the purpose of this study was to examine the relationship that handheld technology had with the ability of nursing students to establish and maintain caring relationships with patients. The study focused on handheld computers used by nursing students during their clinical practicum experiences. The nursing students who participated in the study were enrolled in the third year of a baccalaureate nursing education program offered by a Canadian college that has a collaborative partnership with a university. The question guiding this study was: How does the use of handheld computers by a group of baccalaureate nursing students in a Canadian pre-service program support or interfere with their ability to establish and maintain caring relationships as a key competency? Sub-questions examined within this study were:

- How do nursing students and patients describe “caring”?
- What are the nursing students’ and patients’ perceptions about the use of handheld computers in supporting or interfering with caring relationships?
- How do nursing students and patients describe the relationship of handheld computers with student learning about caring practice?

The findings of this research was that handheld computers supported students’ ability to establish and maintain caring relationships but handheld computers also had the potential to interfere.

## **6.2. The Case Study Approach**

Case study was the research method used in this study to answer the above research questions. According to Yin (1993) a case study is an appropriate research method for a broadly defined topic, when the context in which the case is studied is bounded, and when the study needs multiple sources of data to capture the richness of the case. The case study presented here fits all of these criteria. The case study research approach is the in-depth study of a phenomenon in its real-life context, and reflects the perspective of the participants (Gall et al., 2007). The case-study approach can be used to study almost any phenomenon, and is a common approach in health care and education (Gall et al., 2007).

Following the recommendations of Yin (1993) regarding the use of theory in case study research, this study was framed within the concepts of caring and an ethic of caring, as well as four competencies in regard to caring and the use of technology that are expected of the new graduate nurse. The real-life context of this case study was the acute care adult surgical unit in a local hospital where students provided care for patients and patients received care from nursing students and nurses. The case in this study was a baccalaureate nursing education program offered by a Canadian college in a collaborative partnership with a university. The college offered years one and two and the university offered years three and four of the program. In terms of Creswell's (1998) statement that case study research is an exploration of a case bounded by time and place, this case was bounded by time through nine months of data collection from May 2008 to February 2009, and was bounded by place in that student participants provided patient care in a local hospital located in one health region.

In this single-case study, the unit of analysis included four students in the third year of a baccalaureate nursing program that used handheld computers when providing nursing care. Three students were female and one student was male. All four nursing students were in the third year of the nursing program. Also included in the unit of analysis were four adult patients who received nursing care on the acute care adult surgical unit in a local hospital. Three patients were female and one patient was male. For this study, information about the social, historical, and economic setting of the nursing program, the college and the health region in which it was situated was

explained as this information provided a detailed picture of the setting for this case study. Documents regarding policies, nursing program course syllabi, and practice guidelines also contributed to the context of this case study.

## **6.3. Caring and Technology**

### **6.3.1. *Caring Theories***

Benner and Wrubel (1989) stated that theory is derived from practice. Expert practice develops clinical knowledge that can help inform theories (Benner & Wrubel, 1989). Theories can help inform practice, such as the caring framework used in this study. The practical world is more complex than can ever be fully captured by theory; however, theories provide guidance to the nursing student and novice nurse, enabling them to develop expert practice over time (Benner & Wrubel, 1989). Theories related to the concept of “caring” were used in this study to frame the issue of technology in nursing education and guide the research questions.

Caring theory focuses on the work of Tarlow (1996), Noddings (1984), Watson (2006), Benner and Wrubel (1989), and Benner and Gordon (1996). All the authors identified that caring takes place in a relationship involving participants; one who cares and one who receives the care. While the emphasis of the discussions of the caring relationship differed among the authors, there was agreement that caring occurs within the human relationship. Noddings (1984) identified the need for engrossment, and seeing as though the eyes of the one-caring have combined with the other. Watson (2006) talked about spiritual connection, engagement with the patients, and being authentically present. Benner and Gordon (1996) stated that caring requires connection and involvement, and discussed how a caring relationship could become transformative. Tarlow (1996) examined relationships of caring and saw caring as a process. While one author described the caring relationship as “resilient,” the others pointed out their concerns regarding its fragility.

### **6.3.2. How Caring Was Recognized**

One of the research questions of this study was: *How do nursing students and patients describe “caring”?* The concept of caring was examined through Tarlow’s (1996) eight caring concepts: “time; be there; talking; sensitivity; acting in the best interest of the other; caring as feeling; caring as doing; and reciprocity” (p. 57). The work of Noddings (1984), Benner and Wrubel (1989), Benner and Gordon (1996), and Watson (2006) also informed the concept of caring and how caring was recognized in this study. In addition to these eight caring concepts, self-care and non-caring were also examined through the work of Watson (2006), Noddings (1984), and Rieman (1986). Caring in terms of time, be there, caring as doing, non-caring, talking, acting in the best interests of the other, caring as feeling, reciprocity, self-care, and sensitivity were examined and formed the basis of the analysis of the concept of caring. Although all ten of the caring concepts were discussed by students and patients, the four concepts that were discussed most frequently were: time, be there, caring as doing, and non-caring.

## **6.4. Handheld Computers Supported and Could Interfere with Caring Relationships**

Another research question of this study was: *What are the nursing students’ and patients’ perceptions about the use of handheld computers in supporting or interfering with caring relationships?* According to participants, handheld computers helped students to establish and maintain caring relationships, as they enabled students’ caring relationships with patients to continue without interruption. For example, students looked up information without leaving the patients’ bedside. One patient said she felt cared for and reassured when the student looked up a medication because he was making sure he was giving the medication correctly. However, students rarely used handheld computers in the patients’ rooms. Students stated they used handheld computers prior to entering the patients’ rooms so they were confident in their knowledge and would not cause anxiety in the patients by being unsure.

In this study, participants also identified that handheld computers could be a barrier to establishing rapport. Use of the handheld computer in front of the patient was described as “impersonal” and it “takes away from the relationship.” Students would

rather talk directly to the person, rather than look at a handheld computer screen. Students did not want to convey to the patient they were more interested in the handheld computer than the patient. The concern expressed by participants was that the attention of the student would be on the handheld computer and not the patient. This concern is similar to a study done by Cornelius (2005) who found that handheld technology could be a barrier to the nurse-patient interaction. Johansson et al. (2011) found that some nurses believed patients could be uncomfortable when nurses used handheld computers in front of them.

Although students and patients commented that handheld computers contributed to caring relationships, participants also recognized handheld computers had the potential to interfere with students' ability to establish and maintain caring relationships. The majority of the students and patients said handheld computers supported more than interfered with caring relationships. This is in contrast to Cornelius (2005) who found handheld computers could interfere with nurse-patient interaction. This study's finding may have differed from Cornelius' (2005) findings because the students in this study rarely used handheld computers in front of patients.

#### **6.4.1. Time**

The concept of "*time*" in relation to the use of the handheld computer was discussed the most extensively by all of the participants. Both students and patients stated using the handheld computer gave students more time to spend with patients and more time for patient care. The descriptions of handheld computers as "fast," "efficient," and "convenient" were all focused on the immediate availability of information and this was seen as beneficial and important. These descriptions are in alignment with Koeniger-Donohue (2008), who found that students saved time when using handheld computers because they were able to look up information readily. Use of a handheld computer allowed more time to be directed towards patient care (Johansson et al., 2011). The time saved through the use of the handheld computer to access information "right there" and "right now" allowed the students more time for patient care. This aligns with Tarlow (1996) who stated time was a critical component of the concept of caring. The students were able to "look up" information readily, and were able to give that saved time to patient care. Students stated they could spend time interacting with patients,



could respond faster to patients who needed pain medication, and could have more time to sit and talk with patients. Gosling et al. (2003) point out that provision of resources electronically at the point-of-care may assist in overcoming the barriers of accessibility and the limited time nurses have available to find information. Handheld computers support nursing students' ability to establish and maintain caring relationships because it frees up time that they are able to spend with patients.

Students having time to spend with patients was important. According to patients, they need to have students spend personal time with them. Students having time to be with patients allows them to practice caring skills. Caring was described as students being involved with whom they were caring for. Patients stated that if students do not spend time with patients, they are seen as non-caring. Patients commented students and nurses do not seem to have enough time to do their jobs. Patients said it sometimes feels like students have to rush away to do something else. If it looked like the student was rushed, and there was something else the student would rather be doing, patients did not consider this to be quality time. One patient said she felt like she was being rushed home from the hospital after surgery. The concept of "*time*" was connected to the concept of "*be there*." In order for the student to be there for the patient the student required time. The handheld computers saved students time so they could "*be there*" for the patients.

#### **6.4.2. *Be There***

"*Be there*" was another important concept to the participants, particularly for patients. Patients and students identified the need for students to be there for patients. The patients need to have actual contact with the students. It was important to participants that patient care was one-on-one with no distractions. The patients needed to feel they were important to the students and the students were interested in how they were feeling. These findings are consistent with the caring concept of "*be there*" identified by Tarlow (1996) and with Noddings' (1984) concept of "engrossment." This ability to be present was also identified as important to the concept of caring by Benner and Wrubel (1989) and Watson (2006). According to Watson (2006) and Benner and Wrubel (1989) the caring relationship involves the ability to be present, to be there with a patient. Caring involves knowing, being with, doing for, enabling, and maintaining belief:

“Caring is always related to issues of concern and significance” (Benner & Wrubel, 1989, p. 5).

### **Focus on the Patient**

Both students and patients stated the focus needed to be on the patient not the handheld computer. In order to be caring, the students’ attention needed to be focused on the patients. Patients and students identified that if the focus of the students was not on the patients it would be non-caring. The handheld computer had the potential to interfere with the caring environment if the student’s attention was on the handheld computer, rather than the patient. According to Noddings (1984) and Watson (2006) the caring relationship calls for the one-caring to enter and stay within the other’s frame of reference. Kerr and Sironnik (1997) argue that technology can endanger nursing care when the nurse’s attention turns toward the equipment rather than to sustaining the relationship between the nurse and the patient. This need to have the focus of the student on the patient supports the competency that requires that the nurse “establishes and maintains a caring environment that supports clients to achieve optimal health outcomes, goals to manage illness or a peaceful death” (CNO, 2008, p. 14). This is also in alignment with Almerud et al. (2008) who pointed out, “the flaw is not turning to the device *per se*; it is turning away from the person” (p. 60). Students and patients stated that if the attention of the student is on the handheld computer rather than the patient, the student would not “*be there*” for the patient and the student was non-caring. Alternatively, if the student focused on the handheld computer for a purpose related to the patient, the student would “*be there*” for the patient.

### **Point-of-Care: Not at the Bedside**

Altmann and Brady (2005) found handheld computers facilitated nursing student learning as they provided access to accurate information at the point-of-care. For the most part, students in this study did not use handheld computers in the patients’ rooms, even though the handheld computer was mobile and could fit in the students’ pocket. The majority of the time students used the handheld computer at the medication cart, in the nursing station when they were preparing medications for administration. While students used the handheld computer like a book, both students and patients viewed it as superior to using a book. Students did not have to go look for a book which may

have been unavailable, nor did the students have to look in several books for the information. The handheld computer had all the information in one place and was a compilation of everything students had learned. Information was readily available to the students, rather than having to go and look for it. These findings are also in alignment with Altmann and Brady (2005), who found handheld computers facilitate nursing student learning as they provide access to accurate information at the “point-of-care,” even though the point-of-care was not at the patients’ bedside in this study.

This lack of use of the handheld computer at the patients’ bedside seems at odds with students wanting to have information at their fingertips. As the information was right there students would not have to leave the patient to look up information. However, students explained they felt more confident and comfortable if they used the handheld computer to look up information prior to going into the patients’ rooms. Students said they wanted to feel prepared and needed to know what they were doing before going into the patients’ rooms. This need to know information prior to entering patients’ rooms could be related to why students rarely used the handheld computer in patients’ rooms. Students may be sensitive to seeming unprepared or not knowledgeable because students may be perceived as knowing less than a registered nurse.

### **Self-care**

Although the need for self-care was only identified by one student, self-care is an important component of caring. The student who cares for him or herself has the resources to “*be there*” for patients, and is prepared to care. Noddings (1984) said the ethic of care advocates a deep and steady caring for self. The need for the one-caring to pay attention to self-care was echoed by Watson (2006), who identified caring for the self as a pre-requisite for caring. The need for self-care was also supported by Stark et al. (2005), who pointed out that nurses who care for themselves will have the personal resources to care for patients. This focus on self-care is important, as stress and burnout does occur among some nurses.

The concept of “*be there*” is connected to the concept of “*caring as doing*.” Sometimes the focus on “doing” interferes with the ability of nursing students to “be with” a patient. If the students’ agenda was more important than the patients’ it was seen as

non-caring. It was also seen as non-caring if getting things done was more important than the patients.

#### **6.4.3. *Caring as Doing***

*“Caring as doing”* was another caring concept that was considered to be important, particularly by patients. Students and patients described a variety of caring behaviours. For example, doing little things such as getting a drink of water for the patient was seen as caring by patients. A patient talked about how the student brought her a blanket and how that action made her feel cared for. Patients said that students should be fulfilling needs the patients would normally be doing themselves, but are not able to do. According to patients, students need to make sure patients have what they need so patients will feel well taken care of. One patient also described the student checking a medication as a caring action.

Tarlow (1996) points out doing things involves thinking about, negotiating and carrying out what was deemed best for the other. Benner and Wrubel (1989) stated that knowing and doing are inseparable in caring. Without a set of caregiving skills and practices, the person cannot join in being a caregiver (Benner & Wrubel, 1989). This concept of *“caring as doing”* also aligns with Musk (2004) who says that caring may include technological competence. On the other hand, Watson (2006) saw caring as a moral ideal, rather than a task-oriented behaviour. Noddings (1984) also saw caring as a moral ideal, but did discuss the dimension of competence and the need to practice caregiving skills. According to Noddings (1984) instrumental thinking may enhance caring. While the moral aspect of the ethic of caring is critical, developing a set of caregiving skills in order to help the one in need of caring was also deemed necessary. Students and patients considered handheld computers as an important source of information that supported students’ ability to provide evidence-informed care. For example, handheld computers provided information about medications that students used to learn caring skills.

#### **6.4.4.    *Non-caring***

Interestingly, while students made few comments about the concept of “*non-caring*,” patients had much to say about this issue. “*Non-caring*” is connected to the concepts of “time,” “be there,” and “caring as doing.” The patients saw that a focus on “*doing*” was not “*caring*.” Patients considered it to be non-caring if the students did their work only because it was their job. If the students’ focus was on their job, or what they needed to get done, rather than the patients, it would be non-caring. Patients stated that non-caring students are nervous, do not have good people skills, and do not get actively involved with caring for patients. If the students did not smile, were not cheerful, and did not enjoy their job, it was considered to be non-caring. In addition, another patient stated that if the students were non-caring, the patients would be left alone to fend for themselves.

These findings are consistent with Rieman (1986), who found patients described non-caring as the nurse not being present, but there only to get the job done. Noddings (1984) pointed out the one-caring may become non-caring if the focus remains on instrumental thinking or problem solving. Treating the person as a type instead of an individual objectifies the person, and the person becomes a case instead of an individual (Noddings, 1984). For example, if students use handheld computers to look up information about a task and focus on the handheld computer rather than the patient, the handheld computer would interfere with caring.

#### **6.4.5.    *Talking***

Students need to talk with patients, ask them how they are feeling, and find out why they are upset. Students need to listen to patients to find out their needs. Patient care needs to be a one-on-one interaction with no distractions and with nothing taking away from that patient relationship. Students and patients stated the handheld computer could be a distraction that would take away from the one-on-one interaction between the student and the patient. These findings support Tarlow (1996) who says talking is an important means of building and maintaining caring relationships, and an important part of how caring happens. Noddings (1984) also saw dialogue as important in nurturing the ethical ideal of caring. Watson (2006) discussed the importance of promotion and

acceptance of expressing positive and negative feelings, which involves talking. Benner and Gordon (1996) identified hearing who the other is as important to the caring relationship.

Although talking is an important component of caring, non-verbal communication is a crucial part of the caring relationship. Patients and students commented on the importance of non-verbal communication, such as a smile and the way the student approached the patient. However, only one student discussed the importance of physical touch as part of caring. Some patients are not able to dialogue verbally for many reasons, such as their developmental stage or illness; therefore, verbal dialogue may play a smaller role in those caring relationships. Even with patients who are able to participate in verbal dialogue, sometimes touch is a much more effective way of conveying caring. The handheld computer could interfere with the use of touch to convey caring to patients. For example, if the student has the handheld computer in his or her hand, the student will not have hands free to touch the patient.

#### **6.4.6. *Acting in the Best Interests of the Other***

A caring student was described by a patient as someone who looks after people and cares about what is going on in the world around them. Students identified doing their best and providing the best care as caring. One student explained caring was going out of your way to show patients basic human compassion. This finding is consistent with Tarlow (1996), who pointed out those caring want to understand what needs to be done in order to achieve some desired end that would assure the well-being of the person. According to Noddings (1984) the one-caring acts to protect, enhance, and promote the well-being of the cared-for.

#### **Virtue of Nursing**

One patient commented that nurses would not be in the nursing profession if they did not care, and nurses would definitely be caring. By virtue of being a nurse, the student would convey the notion of caring and trustworthiness. This finding parallels Watson's (2006) notion of caring as a moral ideal rather than a task-oriented behaviour. This finding is also in alignment with Watson's views of the transpersonal caring relationship as a foundational concept. "Transpersonal caring" involves connecting with

the spirit of the other through the process of caring (Watson, 2006). Benner stated that the perspective of nursing was based on the notion of good that is inherent in nursing practice. The notion of benevolence identified by Noddings (1984) and Tarlow (1996) is an important part of caring. For example, patients who nurses label as “non-compliant” actually may have good reasons for not following the plan of care. If nurses view these patients in the best possible light, and patients attribute caring motives to the nurses, the caring relationship is supported.

According to Noddings (1984), institutions cannot be ethical because institutions insist upon the affirmation of certain beliefs, and they separate members from non-members. Noddings (1984) also believes rules contribute to the erosion of genuine caring. Nurses, as a group, could be considered an institution with rules governing behaviour through standards, competencies, and codes. Nursing regulatory bodies separate non-members from members through registration of nurses. For example, nursing students can be members of a nursing regulatory body such as CRNBC but patients cannot.

If nursing can be considered an institution, Noddings’ (1984) claim that institutions cannot be ethical is surprising. Nurses are expected to comply with a code of ethics (CNA, 2008) and understand, uphold and promote the ethical standards of nursing (CRNBC, 2012a). Nurses would describe themselves as ethical. On the other hand, Noddings’ analysis of institutions as not being able to meet the particular “other” as one-caring seems accurate. The design and control of health care is based on treatment that can be counted and priced. This focus on the economics of health care can be in opposition to the skillful ethical behaviour of nurses. Nurses, as a group within an economics-based health care system, may not always have the ability to meet the patient as a particular “other” or act in the best interests of the “other.”

## **Safety**

The handheld computer was reported to be a beneficial tool that was used to prevent harm to the patients. Both students and patients stated handheld computers contributed to patient safety; and therefore, contributed to the best interests of patients. Johansson et al. (2011) believe the handheld computer “might be a valuable decision-supporting device for nursing and can subsequently improve patient safety and patient

outcomes” (p. 861). Students used handheld computers to look up medications prior to giving them and ensured they were following the rights of medication administration. Both students and patients stated handheld computers prevented medication errors. In addition, patients commented the handheld computer could be used to check patients’ allergies. Information about patients’ allergies would alert nurses to contraindicated medications. While checking patient allergies is not currently a function of handheld computers, this is a potential use of the handheld computer.

#### **6.4.7. *Caring as Feeling***

Patients can tell the student is caring by their affect, by their attitude, and the way they approach the patient. Caring students were seen as supportive and friendly. Enjoyment of their job was a caring quality identified by patients. For example, students were described as caring when they enjoyed helping the patient, enjoyed coming to see the patient, and enjoyed their job. Patients identified caring students as having a smile, being cheerful, and having a sense of humour.

One patient stated that she felt nurses are caring because they are nurses. This patient viewed caring as a core value of nursing and described nursing as a caring profession. This patient’s feelings about caring as part of nursing is in alignment with Watson (2006) who stated caring is the essence of nursing and the nurses’ intentionality must be focused on caring. This patient recognized nurses exercised the virtue of caring in order to achieve the end of goods for her, the patient.

#### **Patient Comfort**

Comfort was an important part of caring. Patients stated they should be as comfortable as possible. For example, patients said it was important that students managed post-operative pain well, and not let it get out of hand. If patients are in pain, their hospital stay will not be as positive. Patients said they should not have to ask for pain medication. Students needed to ask ahead of time if the patients needed pain medication. Students also needed to ask if there was anything patients needed, or if there was anything the students could do to make patients more comfortable. If patients are warm and comfortable, they will better be able to deal with the stress associated with hospital stays. Caring students were described by a patient as making the patient feel



just like they put their arms around the patient. These findings fit with the concept of caring as “feeling.” Feelings of concern and/or affection about the person are tied to why people care (Tarlow, 1996). According to Benner and Gordon (1996) caring relations are guided by feeling; Noddings (1984) further described “caring for” involves a “feeling with the other” for the one-caring.

## **Confidence**

Patients stated they felt stressed if the students were uncertain. One patient commented that when students are uncertain and stressed, the patients feel those emotions in the student. Students said they worried and got stressed when they did not know something. Altmann and Brady (2005) pointed out that students feel anxious about medication administration, which is the greatest source of clinical errors. One patient said that she felt cared for when the student looked up the medication to be sure it was correct before giving it to her, and she felt more reassured. When students had a handheld computer that provided immediate access to information, some of the stress related to not knowing was alleviated. Knowing the information was right at hand helped students to build confidence. This finding is similar to Wu and Lai (2009), who found handheld computers were a support system for students during clinical and resulted in students who were more self-confident.

Both students and patients pointed out that students feeling confidence in their nursing role was important. One patient commented that when the students had confidence, it made the patient feel more confident. Students said handheld computers helped them with their confidence. Three of the patients agreed that handheld computers made the student more confident in their job. Johansson et al. (2011) found confidence of nurses was improved with use of handheld computers and went on to say if nurses felt confident, the quality of patient care could also be improved. One patient stated the students would know what they are talking about and wouldn't feel like they are questioning themselves when using a handheld computer. According to one student, if she used the handheld computer before going into a patient's room, she felt more prepared and confident, which also connects to the earlier theme of being prepared and caring.

## **6.5. Handheld Computers May Not Make a Difference**

### **6.5.1. *Reciprocity***

Patients and students also considered developing a relationship to be important. A student commented that for students to develop relationships with patients, the patients have to feel that the students really care about them. Noddings (1984) identified reciprocity as an important part of the caring relationship. Tarlow (1996) commented that the reciprocal relation was essential for a caring relation. Benner and Gordon (1996) said some patients, through their trust, openness, and capacity to receive and extend the care they are given, can participate in caring relationships that become transformative.

At first, the argument that caring needs to be received and acknowledged by the cared-for in order for the relationship to be considered caring was surprising, but once the necessity of the cared-for to be receptive was understood, this requirement was clearer. What is helpful is the notion that the one-caring cannot be solely responsible, nor blamed for the successful completion of the caring relationship. In nursing, however, the completion of the caring relationship is sometimes difficult to determine, and may not be recognized by nursing students. Noticing subtle clues regarding needs was identified as important (Tarlow, 1996). Benner and Gordon (1996) pointed out that caring makes nurses notice subtle signs in the patient, and caring also required a special set of skills. It may take time for students to develop the skills to recognize the subtle signs that caring is being received by the one being cared-for.

The contribution of the one cared-for has a major role in the completion of caring in the relationship. Some nursing students have commented that they prefer clinical experiences in surgery because the patients get better and go home, in contrast to many patients with chronic illness who remain in hospital for long periods. Those students caring for medical patients may not have experienced the necessary reciprocity Noddings (1984) and Tarlow (1996) identified. Without this reciprocity, the caring relation may have felt incomplete for these students.

### **6.5.2. Sensitivity**

This concept was not clearly articulated by the participants. Patients identified it was important for students to gain a good rapport with patients. Students also needed to anticipate the needs of patients. A patient commented that looking out for patients' needs takes the worry away and makes them feel better. One patient commented that a nurse demonstrates caring when the nurse helps alleviate fear. Students described caring about the patient as staying with the patient when they were upset and trying to find out why.

These findings somewhat reflect the caring concept of "sensitivity" identified by Tarlow (1996). Sensitivity is a complex concept and a variety of factors were related to noticing the needs of others such as a reservoir of experiences (Tarlow, 1996). The more time people had spent together provided knowledge that enabled people to be more readily sensitive to the needs of others (Tarlow, 1996). Watson (2006) identified the need for opening to others with sensitivity and compassion. Benner and Wrubel (1989) also pointed out that part of caring was the importance of noticing which interventions help, and noticing subtle signs of improvement or deterioration in the patient. The expectations of patients for their needs to be anticipated, their fear to be alleviated, and peace of mind to be provided seem to fit with the notion of students being "sensitive" to the patients.

## **6.6. Student Learning and Handheld Computers**

This study also examined the following question: *How do nursing students and patients describe the relationship of handheld computers with student learning about caring practice?* Purposes of handheld computers, ease of access to information, nursing knowledge, nursing practice, and technical support were examined. Handheld computers supported students' access to current accurate information, development of nursing knowledge, and nursing practice.

### **6.6.1. *Purposes of Handheld Computers for Nursing Students***

The most common purpose of handheld computers as described by patients and students was to “look up information.” These findings are consistent with Koeniger-Donohue (2008) who found the handheld computer enhanced clinical experiential learning as students were able to look up information readily. Information about medications was the most frequent use that students and patients discussed. This use is in alignment with Farrell and Rose (2008) who found that the majority of nursing students in their study thought the handheld computer enhanced their knowledge regarding pharmacology, and was a valuable learning tool for use in clinical settings, the classroom, and at home. Students stated they used handheld computer programs such as a drug guide, a laboratory guide, and a medical text reference to access information while in the clinical area, which echoes the findings of Altmann and Brady (2005).

### **6.6.2. *Ease of Access to Information***

Both students and patients described handheld computers as easy to use and information was easier to find. The handheld computer was considered to be user friendly, self-explanatory and simple to learn. Students and patients viewed the handheld computer as making the job of a student easier. Handheld computers are a source of current relevant information. These findings were in agreement with Altmann and Brady (2005) who found handheld computers facilitated nursing student learning as they provided access to accurate information at the point-of-care.

Convenience was a word used by all of the students to describe the benefits of the handheld computer. Other words used by both patients and students were “handy,” “right at hand,” “right there,” and “at your fingertips.” According to students and patients, the handheld computer was more convenient to carry than books, a laptop, or a desktop computer. Johansson et al. (2011) found handheld computers could save time through reducing the amount of time nurses spent looking for information from sources such as books.

### **6.6.3.    *Nursing Knowledge***

Patients identified the need for students to learn. Patients were aware students were not able to memorize everything and did not expect students to know everything. Handheld computers are sources of information that help students build their knowledge and skills. According to patients, if the students did not know something, they could look it up. Students use handheld computers as a source of information if they do not know what to do, if they have not learned something, or they are trying to learn more about a situation. The students then have the knowledge they need, so they are able to assess the patients' health status more thoroughly and quickly. Patients stated if students had all this information in front of them, and they were looking up information at the same time they were doing a caring skill, they would learn and remember more easily.

Students want to know more information and consider it as part of their role to look up everything. Handheld computers provided the students with information, and helped them process information and learn. It helped students gain their initial knowledge base. For example, students recognized they were not able to memorize or become familiar with all the medications. Students talked about the importance of being able to look up a topic if they could not remember. Students used phrases such as *it starts to sink in* and *it will start to stick* and *now it is in my head* when they described how they looked up the medications consistently, repetitively, and frequently enough so they would become more familiar with them.

According to students, handheld computers enabled the students to be more knowledgeable and credible. Students liked knowing what they were talking about. Students stated it was important to know more information about the patients' health condition. Students talked about needing to know and understand what to expect, what they should be looking for when assessing the patient, what could go wrong, what would not be expected, and how a lab value and a drug would affect each other. Handheld computers also helped students do research and find out about something they had not heard about before.

#### **6.6.4.    *Nursing Practice***

According to students, they are learning how to be nurses and are new in their practice. Students said handheld computers made them better student nurses. Students stated that handheld computers help them to be better organized. Wu and Lai (2009) found that student learning was better organized with the use of handheld technology. A student commented the handheld computer helped her analyze the situation better and connect all the pieces together. The handheld computer was considered to be part of their practice, helped students to integrate and synthesize patient information, and to understand the patient holistically. Handheld computers supported students' practice and made their clinical practice easier. Some students stated the handheld computer was something every student should have. These findings support Miller et al. (2005) who found nursing students with handheld computers had a greater recognition of the need to use current resources which conveys "the professional value of seeking information for use at the bedside" (p. 26).

### **6.7.    Lessons Learned**

#### **6.7.1.    *Balance of Techne and Telos***

Participants saw the need to frame technology with an ethic of caring. The students and patients are not only concerned about the "science" of nursing, but also about "caring" as essential components of nursing. The students and patients saw that the ends (the good of humankind) and means (the journey to get there) cannot be separated in nursing or nursing education. The students used not only their evidence-informed scientific knowledge, but also the virtue of caring to provide a service to the public—to achieve the end: the good of humankind. Nursing is the amalgam of both of these parts which must be in balance for nursing and nursing education to be effective. The participants were aware there needed to be a balance of *techne* and *telos*. The handheld computer contributed to *techne* by providing students with convenient access to current information to support evidence-informed nursing judgements; and *telos* by providing more time for students to practice caring skills with patients.

### **6.7.2. *Underutilization of Handheld Computer***

Students were underutilizing the functionality of handheld computers. For example, most students did not use the handheld computer for patient teaching. This may have been related to students rarely using the handheld computer in the patients' rooms. Not using the handheld computer at the patients' bedside is a lost opportunity. Patients were receptive to the handheld computer being used for teaching, so this is an area for further integration of the handheld computer into clinical learning. The handheld computer can be used to provide information that would support patient teaching activities. For example, if the patient asked a question about the student using the handheld computer, the student could show the patient what she or he was doing and how she or he was finding information. Patients stated it is important for the students to explain to patients ahead of time what they are doing, and prepare them for what is coming up. The handheld computer could help students share information with patients when they have questions. Students can provide information for patients right away without the student leaving the patient's bedside to look up the information in a book.

Not all students were consistently updating their medication information on their handheld computers. In addition, not all students were accessing journal articles on their handheld computer. As a result, the information that the students are relying on may not always be as up-to-date and accurate as possible. This could result in students basing their care decisions on out-of-date or incorrect information. This is an important concern as the risk for harm to patients may be increased.

### **6.7.3. *Lack of Technical Support***

While the handheld computers were described as easy, intuitive, and user friendly, patients and students identified the need for students to have access to technical support. Suggestions included a help line, online help, technical support as part of the nursing program, and support through a nursing technology course. Koeniger-Donohue (2008) recommended that support be readily available for faculty and students using handheld technology. If students had access to technical support, or an informatics course, students may then use handheld computer functionality more fully.

#### **6.7.4. *Lack of Policy and Gaps in Program Aims***

The current guidelines in place in the health region have the potential to interfere with work-related use of handheld computers in the presence of patients. For example, the social media policy indicates handheld devices should not be used in areas where patient care is being delivered. This policy is to prevent personal use of handheld devices from interfering with patient care. However, it is difficult for an observer to know if a student is using a handheld computer for a legitimate nursing practice related purpose or for personal use. This policy may preclude the use of handheld computers at the patients' bedside. Policy needs to be developed that supports the work-related use of handheld computers to enhance the provision of safe competent patient care.

The lack of program aims addressing caring and information technology skills is a gap in the nursing program curriculum. Caring is identified in the program statement of nursing which provides some support and recognition of caring as central to nursing practice. The addition of caring in the program aims would provide further support for caring to be recognized more overtly in the curriculum. For example, if caring was included in the aims of the program, caring concepts could be more clearly identified in nursing course syllabi. This gap does not provide support for the development of information technology skills through an informatics course or the integration of handheld computers into clinical learning experiences. Addition of information technology in the aims of the nursing program would provide direction for the development of an informatics course and integration of handheld computers and other technology into the curriculum, particularly into clinical learning experiences.

#### **6.7.5. *Cost of Handheld Computers***

Patients and students identified the handheld computer is expensive to purchase. Not all students can afford to buy one. Often a family member bought the handheld computer for the student. Students and patients stated handheld computers should be subsidized, particularly if they are a nursing program requirement. According to Altmann and Brady (2005), the cost of handheld computers and software programs can prohibit their use. Students and patients stated the nursing program should support student access to handheld computers. Students and patients provided suggestions for how the



nursing program could support student use of handheld computers. Funding or a discounted rate should be available so students could afford to buy a handheld computer. If the college bookstore bought handheld computers in bulk, they would be more affordable. Altman and Brady (2005) suggested institutions develop relationships with handheld computer companies and that college bookstores buy equipment and software in large enough quantities so students can take advantage of lower prices. The National League for Nursing (NLN) Task Group on Instruction Technology reviewed a variety of articles regarding the use of PDAs in nursing and summarized relevant information for nursing education (Zurmehly, 2010). A strategy this NLN task group identified is for nursing instructors to make the move to electronic resources as a way to reduce expenses for students as the cost of software for handheld computers is often less than the cost of textbooks (Zurmehly, 2010).

#### **6.7.6. *Dislike of Electronic Devices***

Although none of the student participants identified dislike of electronic devices as a barrier to their use of the handheld computer, they commented some students may not want to use the handheld computer due to their dislike of technology. According to student participants some students love technology and use it frequently and some students hate technology and use it rarely. During the recruitment phase of this study, some students cited their dislike of electronic devices as a reason why they did not have a handheld computer. Altmann and Brady (2005) found some students' dislike of electronic devices can prohibit the use of handheld computers. Zurmehly (2010) also said dislike of electronic devices among faculty can also be a barrier to the use of handheld computers. However, with advances in technology and improved devices, such as smart phones and Ipads, students may be more likely to use handheld devices.

#### **6.7.7. *The Researcher's Understanding of Caring***

This study has changed how I view caring and I now have a better understanding of what is important to patients and students in terms of caring. Both the students and patients were articulate in describing what caring was and was not, and how handheld computers supported caring relationships. Time was discussed extensively by both patients and students and handheld computers can clearly contribute to caring through

saving time that can be spent caring for patients. Patients and students were also articulate about the use of handheld computers to “look up information” and understood that access to current information positively contributed to student learning. Patients and students identified the risk that handheld computers could interfere with caring relationships if the focus was on the device rather than the patients. The focus needs to be on patients in order for “doing” to be caring.

I was surprised that students rarely used handheld computers in patients’ rooms, but students explained they wanted to be knowledgeable and confident when they were with the patient. I was also surprised at the imagination of the patients when describing the possible uses of handheld computers, such as emailing the physician with a question regarding patient care. It also surprised me when a patient explained that nursing was a caring profession even though she had non-caring experiences with nurses. This finding supports the notion that caring is resilient and can tolerate some lapses in caring.

This work would not have been completed without the caring I received from my family, friends, colleagues, and supervisors. This work also could not have been completed without technology. For example, technology in the form of computers and email allowed me to have supervisors in three different communities in Canada and still be able to readily share my work and receive guidance and feedback. I have learned this work requires virtues such as courage, resilience, and persistence. I saw the following saying on the wall of a rehabilitation unit in a hospital and put it on my wall where I could see it every day: “Courage does not always roar, sometimes it is the little voice at the end of the day that says I will try again tomorrow” (Anonymous). I have also learned that although this journey was challenging and at times seemed impossible, it was possible, rewarding, and I am glad that I persevered.

## **6.8. Limitations of the Study**

This case study examined how the use of handheld technology was related to nursing students’ ability to establish and maintain caring relationships. This study was done with a small number of participants; therefore, the ability to generalize to other populations is limited. In addition, the student and patient participants may have differed

from the other students in the nursing program and other patients. For example, the student and patient participants may have been comfortable with technology and may have viewed the handheld computer more positively than students and patients who did not participate in the study. The study findings may have been influenced by the different devices the students used. Some students used a Palm Pilot and some used an HP. There was no student comparison group in this study; therefore, students using handheld computers could not be compared to students who were not using handheld computers. The alternative method of recruiting two of the patient participants limited their ability to talk about student use of handheld computers because these two patients did not receive care from student participants who used handheld computers. Other factors that contributed to the limitations of the study are related to the researcher such as, the researcher's biases, the researcher's close association with all the institutions involved, and the researcher's leadership role in the college where the nursing program was offered.

## **6.9. Recommendations for the Nursing Program**

The study and the literature review supported the use of handheld computers as an effective tool for supporting student learning in the clinical setting. Acting on the insights gained from this study in terms of technology framed by an ethic of caring, the following recommendations emerge from the research:

- Patients and students clearly articulated the importance of caring relationships. The baccalaureate nursing program statement of nursing identifies caring as a central and dominant feature of nursing, yet the program aims do not include caring. A statement about caring should be included in the aims of the nursing program. Caring should also be more overt in the nursing program course objectives and the methods of student evaluation. This would help reinforce the importance of caring in nursing practice.
- Patients and students identified handheld computers supported caring relationships and student learning. Information technology skills should be included in the aims of the baccalaureate nursing program. Currently the aims include that students will meet professional practice requirements as identified by "the Competencies document" (College of New Caledonia, 2012). Identifying the need for technology skills more specifically in the aims would support the integration of handheld computers in the nursing program.

- Students and patients pointed out the need for technical support for nursing students. The nursing program should develop and offer an informatics course within the nursing program. This informatics course would encourage students to use handheld computers to support experiential learning in the clinical area. Using handheld computers in the clinical area would enable more students to have readily available access to current, accurate information to support the development of nursing knowledge. Using handheld computers would also provide students with more resources at their finger-tips to support the provision of safe, informed, and competent care for patients.
- Students identified they were not fully utilizing the functionality of handheld computers. The nursing program informatics course should include guidance for students regarding how, when, and where to use handheld computers. The guidelines should also address the importance of focusing on caring when using handheld computers in the provision of patient care. This would support the importance of caring and the appropriate balance of *techné* and *telos*.
- The nursing program should explore ways to integrate the use of handheld computers into the curriculum, particularly for clinical learning. For example, nursing faculty could role-model use of handheld computers in the clinical setting. This would support more effective use of handheld computers as caring and learning tools.
- Current Northern Health policy precludes the use of handheld computers in the presence of the patient. The college does not have policy guiding the use of handheld computers in the clinical area. The college should develop a policy that includes guidelines regarding the use of handheld computers in the clinical area. The guidelines need to include information about the protection of patients' privacy. This policy would guide the appropriate use of the handheld computer in the provision of patient care and support the protection of patients' privacy.
- Students and patients recognized the cost of handheld computers and programs can be a barrier to their use. Since the addition of handheld computers into nursing programs can result in increased costs to students, creative strategies to address this issue are necessary. The college should offer students handheld computers and programs at a discounted or group price. This might be achieved by partnering with other educational institutions, or with companies that offer handheld computer technology. This would help to offset the expenses related to the handheld computer and enable more students to purchase the handheld computer and programs.

Nursing programs have an obligation to provide students with learning experiences that will provide them with the opportunities to meet the competencies expected of the new graduate. These competencies include the requirement for new nursing graduates to provide a caring environment that supports patients (CNO, 2008). Caring competencies require that the registered nurse “establishes and maintains a

caring environment that supports clients to achieve optimal health outcomes, goals to manage illness or a peaceful death” (CNO, 2008, p. 14). As well as providing a caring environment, nurses are expected to understand and utilize technologies that “change, enhance or support nursing practice” (CNO, 2008, p. 8).

## **6.10. Conclusion**

In reflecting on the purpose of this study and the explored research questions, one can conclude that the handheld computer supported students’ ability to establish and maintain caring relationships, but also had the potential to interfere with caring relationships with patients. Students and patients both identified time as an important component of caring. An important benefit of handheld computers was the time saved through students being able access current and accurate information quickly. Students spent this saved time with providing care for patients. Looking up information regarding medications was the most frequent purpose for which students used handheld computers. Students and patients stated the handheld computer supported patient safety as students were knowledgeable regarding their medications. Another important benefit was students said they were more confident and competent with the information provided by the handheld computer. Patients commented they felt cared for when students were confident. Handheld computers also provided students with information to support nursing decisions.

The handheld computer also had the potential to interfere with caring relationships with patients. Both students and patients were concerned that handheld computers could draw the focus of the student away from patients. This change in focus away from patients was viewed as non-caring by students and patients. However, students, for the most part, did not use the handheld computer at the patients’ bedside, so attention was not drawn away from the patient. Entry-level competencies require registered nurses to provide a caring environment for patients, to possess basic computer literacy, and to be aware of ICT. This study provides a beginning understanding of the handheld computer as a powerful tool that can assist students to meet the entry-level competencies related to both technology and caring.

## **6.11. Recommendations for Future Research**

The study findings show that the potential of the handheld computer is not being fully utilized. Further research into the use of handheld computers in nursing education is required to find ways to take greater advantage of the functionality of handheld computers. In addition, the literature points to a dislike of technology as a barrier to use of handheld computers. This barrier was not a finding of this study, but should be further explored. In light of the study finding regarding the potential of the handheld computer to interfere with the caring relationship, it is important to continue to explore the influence of handheld technology on caring relationships. The sample size of this study was small; therefore, the relationship of handheld computers with caring relationships should be examined with larger sample sizes, other students in different nursing programs, and other patient populations. For example, a group of students who used handheld computers in the presence of patients could be compared to a group of students who used handheld computers in the clinical setting, but not in front of patients.

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## **Appendices**

## Appendix A.

### List of Documents from Organizations

| Document  | Source   |
|---|--|
| Decision Support Tool: Social Media Policy 2010   | Northern Health                                      |
| Fitness to Practice 2008  | CRNBC  |
| Health Authority 5 – Northern Statistical Profile   | BCStats  |
| Health Profile June 2012  | Statistics Canada                                    |
| Historical Highlights College of New Caledonia  | College of New Caledonia                             |
| Medication Administration (2013)  | CRNBC  |
| Northern Collaborative Baccalaureate Nursing Program Report to the Registered Nurses Association of British Columbia 1996 | Northern Collaborative Baccalaureate Nursing Program |
| Northern Collaborative Baccalaureate Nursing Program Student Handbook 2011  | College of New Caledonia Prince George Campus        |
| Phase III Self Study Report to the College of Registered Nurses of British Columbia 2010                                  | Northern Collaborative Baccalaureate Nursing Program |
| Northern Health About Us  | Northern Health                                      |
| Northern Health Quick Facts   | Northern Health                                      |
| Northern Health Strategic Plan 2009-2015  | Northern Health                                      |
| NURS 101 Syllabus (2009)  | NCBNP  |
| NURS 102 Syllabus (2009)  | NCBNP  |
| NURS 204 Syllabus (2009)  | NCBNP  |
| NURS 211 Syllabus (2009)  | NCBNP  |
| NURS 220 Syllabus (2009)  | NCBNP  |
| Practice Standard Duty to Provide Care  | CRNBC  |
| Practice Standard Medication Administration   | CRNBC  |
| Requisite Skills and Abilities 2007   | CRNBC  |
| 2008-09 & 2012-13 Program Guide and Course Calendar   | College of New Caledonia                             |

## **Appendix B.**

### **Study Information Document**

#### **SIMON FRASER UNIVERSITY**

This document describes the goals of the study and the procedures to be used including their risks and benefits. If the study is not for the use of secondary data and there is no requirement to re-contact participants, then this document must be completed in the application. This document is referred to in the consent protocol as the information given to the participants before consent is given, to ensure that the participant's consent is informed consent. Exceptions to the inclusion of a reference to this document in consent protocols may be approved.

**Title: Handheld computers and baccalaureate nursing students: supporting or hindering development of caring relationships with receivers of care**

Investigator Name: Sandra Ollech

Investigator Department: EdD student

#### **Section A**

##### **Place**

Prince George, British Columbia

##### **Who are the Participants (Subjects) in This Study?**

One group of participants is nursing students in year three of the Northern Collaborative Baccalaureate Nursing Program offered collaboratively by the University of Northern British Columbia and the College of New Caledonia. The other group of participants is adult patients at the Prince George Regional Hospital (now the University Hospital of Northern British Columbia)

##### **What Will the Participants be Required to do?**

Each volunteer student participant from the third year of the Northern Collaborative Baccalaureate Nursing Program will be asked to participate in a one-on-one, face-to-face interview to explore her or his use of a handheld computer, and whether a handheld computer influenced the caring relationship with a patient they have provided care for. The interview will likely last about 30-45 minutes. The student participants will be asked to respond to both closed and open interview questions. The interviews will be audiotape recorded and transcribed. Student participants are able to stop the recording of the interview at any time, and will be given the opportunity to view the transcript of her or his interview before analysis. Each volunteer patient participant will be asked to participate in a one-on-one, face-to-face interview to explore their experience with a nursing student using a handheld computer, and whether the handheld computer influenced the care they received. The interview will likely last about 30-45 minutes. The patient participants will be asked to respond to both closed and open interview questions. The interviews will be audiotape recorded and transcribed. Patient participants are able to stop the recording of the interview at any time, and will be given the opportunity to view the transcript of her or his interview before analysis.

### **How are the Participants Recruited?**

The researcher will be contacting prospective participants. Student participants will be recruited through an invitation to participate sent electronically via the e-mail list serve at the University of Northern British Columbia. Flyers will also be posted on the information bulletin board at UNBC. The researcher will also be able to provide information on request regarding the study so interested students will be aware of the study. Patient participants will be recruited by the researcher, with the agreement of the nursing student who provided them with nursing care and the agreement of the patient to be contacted by the researcher. Permission to invite students to participate has been obtained from the chair of the nursing program at UNBC, Dr. Vince Salyers.

## **Section B**

### **Overall Goals of Study**

The purpose of this study is to explore whether handheld computers support or hinder or have no influence on the development of caring relationships between nursing students and those patients who receive their care. This study will increase the understanding regarding the use of handheld computers by nursing students when providing patient care. There is a need to continue to improve and enhance nursing care and nursing education. The ability to utilize technology is a requirement for new nursing graduates. Entry-level registered nurses are expected to possess basic computer literacy and awareness of nursing informatics. They need to know how to locate and use research findings in nursing and related fields to implement evidence-informed practice. With the increased use of handheld computers in nursing, whether the use of the handheld computer contributes positively or negatively to the care of the patient by nursing students needs to be examined.

### **Risks to the Participant, Third parties or Society:**

All participants may have a reaction to being interviewed and have the potential for experiencing anxiety and being inconvenienced by participating in the study. All participants will be monitored for anxiety during the interview and have the opportunity to stop the interview. Student participants may be concerned the researcher will be evaluating their performance as nursing students. Students will be informed their responses during the interview, and the responses of the patient will not be used to evaluate their performance as a nursing student. Their individual responses will be kept confidential and will not be shared with the faculty who is responsible for evaluation of their performance as a nursing student. Patient participants may be concerned they will not be cared for if they do not agree to participate in the study or if they choose to withdraw their consent to continue to participate. Patients will be informed they will receive nursing care regardless of their decision to participate in the study or not.

### **Benefits of Study to the Development of New Knowledge:**

Handheld computers are a relatively new technology being used by some nursing students in the provision of nursing. Research has largely focused on the benefits of handheld computers such as having a broad base of information available at the bedside. This ready access to comprehensive references in the clinical setting may improve patient care by enabling the nursing student to spend more time with the patient, rather than leave the patient to look up information. However, if the handheld computer draws the focus away from the patient, this new technology may have a negative impact on the care of the patient. There is a need to examine the influence of this new technology on care of patients. Participants in the research, both nursing students and patients may benefit from the satisfaction of contributing to improvement in nursing care through research. Participants in the research may also benefit from the satisfaction of

contributing to improvement in education of nursing students. Northern Health will benefit from contributing to the improvement and enhancement of nursing care and nursing education with increased understanding of the use of handheld computers in the clinical setting. Northern Health will also benefit from being able to hire new graduates with improved ability to utilize technology and who know how to locate and use research findings in nursing and related fields to implement evidence-informed practice. The researcher will benefit from being able to contribute to improvement in nursing education and nursing care. The researcher will also benefit by being able to complete doctoral program requirements. Society at large will benefit from improved knowledge regarding nursing care.

### **How Confidentiality and Anonymity will be Assured**

The data of this study will maintain the confidentiality of participant's name and the contributions made by participants to the extent allowed by the law. Any evidence of abuse will be reported as required by law. Identifiable personal information about the participants such as age, date of birth, name, address and phone number will be kept confidential. Each participant will be assigned a code number and that number will be used on all data pertaining to each participant. The tapes of interviews, records and transcriptions will be stored in a locked filing cabinet in a secure office. No secondary non-public use of identifiable data is anticipated. Contact information will be kept for the duration of the study with the permission of the participants and Sandra Ollech will be the only researcher with access to contact information. Contact information will not be kept once the study is completed.

## **Section C**

### **Approvals that may be Required from Agencies, Communities or Employers**

Written permission to invite nursing students to participate in the study has already been obtained from the Chair of the Northern Collaborative Baccalaureate Nursing Program at the University of Northern British Columbia. Ethics approval from the Northern Health research Review Committee is being sought concurrently to enable the researcher to interview patients.

### **Persons and contact information that participants can contact to discuss concerns.**

Dr. Hal Weinberg, Director  
Office of Research Ethics



## **Appendix C.**

### **Informed Consent by Participants in a Research Study**

#### **SIMON FRASER UNIVERSITY**

The University and those conducting this research study subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of participants. This research is being conducted under permission of the Simon Fraser Research Ethics Board. The chief concern of the Board is for the health, safety and psychological well-being of research participants.

Should you wish to obtain information about your rights as a participant in research, or about the responsibilities of researchers, or if you have any questions, concerns or complaints about the manner in which you were treated in this study, please contact the Director, Office of Research Ethics by email at [REDACTED] or phone at 778-782-6593.

Your signature on this form will signify that you have received a document which describes the procedures, whether there are possible risks, and benefits of this research study, that you have received an adequate opportunity to consider the information in the documents describing the study, and that you voluntarily agree to participate in the study.

Title: Handheld computers and baccalaureate nursing students: supporting or hindering development of caring relationships with receivers of care.

Investigator Name: Sandra Ollech

Investigator Department: EdD student

Having been asked to participate in the research study named above, I certify that I have read the procedures specified in the Study Information Document describing the study. I understand the procedures to be used in this study and the personal risks to me in taking part in the study as described below:

#### **Purpose and Goals of this Study:**

The purpose of the study is to explore whether handheld computers support or hinder or have no influence on the development of caring relationships between nursing students and those patients who receive their care. This study will increase the understanding regarding the use of handheld computers by nursing students when providing patient care. There is a need to continue to improve and enhance nursing care and nursing education. The ability to utilize technology is a requirement for new nursing graduates. Entry-level registered nurses are expected to possess basic computer literacy and awareness of nursing informatics. They need to know how to locate and use research findings in nursing and related fields to implement evidence-informed practice. With the increased use of handheld computers in nursing, whether the use of the handheld computer contributes positively or negatively to care of the patient by nursing students needs to be examined.

#### **What the Participants will be Required to Do:**

Each volunteer student participant from the third or fourth year Northern Collaborative Baccalaureate Nursing Program will be asked to participate in a one-on-one, face-to-face interview to explore her or his use of a handheld computer, and whether a handheld computer

influenced the caring relationship with a patient they have provided care for. The interview will likely last about 30-45 minutes. The student participants will be asked to respond to both closed and open interview questions. The interviews will be audiotape recorded and transcribed. Student participants are able to stop the recording of the interview at any time, and will be given the opportunity to view the transcript of her or his interview before analysis. Each volunteer patient participant will be asked to participate in a one-on-one, face-to-face interview to explore their experience with a nursing student using a handheld computer, and whether the handheld computer influenced the care they received. The interview will likely last about 30-45 minutes. The patient participants will be asked to respond to both closed and open interview questions. The interviews will be audiotape recorded and transcribed. Patient participants are able to stop the recording of the interview at any time, and will be given the opportunity to view the transcript of her or his interview before analysis.

### **Risks to the Participant, Third Parties or Society:**

All participants may have a reaction to being interviewed and have the potential for experiencing anxiety and being inconvenienced by participating in the study. All participants will be monitored for anxiety during the interview and have the opportunity to stop the interview. Student participants may be concerned the researcher will be evaluating their performance as nursing students. Students will be informed their responses during the interview, and the responses of the patient will not be used to evaluate their performance as a nursing student. Their individual responses will be kept confidential and will not be shared with the faculty who is responsible for evaluation of their performance as a nursing student. Patient participants may be concerned they will not be cared for if they do not agree to participate in the study or if they choose to withdraw their consent to continue to participate. Patients will be informed they will receive nursing care regardless of their decision to participate in the study or not.

### **Benefits of Study to the Development of New Knowledge:**

Handheld computers are a relatively new technology being used by some nursing students in the provision of nursing. Research has largely focused on the benefits of handheld computers such as having a broad base of information available at the bedside. This ready access to comprehensive references in the clinical setting may improve patient care by enabling the nursing student to spend more time with the patient, rather than leave the patient to look up information. However, if the handheld computer draws the focus away from the patient, this new technology may have a negative impact on the care of the patient. There is a need to examine the influence of this new technology on care of patients. Participants in the research, both nursing students and patients may benefit from the satisfaction of contributing to improvement in nursing care through research. Participants in the research may also benefit from the satisfaction of contributing to improvement in education of nursing students. Northern Health will benefit from contributing to the improvement and enhancement of nursing care and nursing education with increased understanding of the use of handheld computers in the clinical setting. Northern Health will also benefit from being able to hire new graduates with improved ability to utilize technology and who know how to locate and use research findings in nursing and related fields to implement evidence-informed practice. The researcher will benefit from being able to contribute to improvement in nursing education and nursing care. The researcher will also benefit by being able to complete doctoral program requirements. Society at large will benefit from improved knowledge regarding nursing care.

**Statement of Confidentiality:**

The data of this study will maintain confidentiality of your name and the contributions you have made to the extent allowed by the law.

The data of this study will maintain the confidentiality of the participant's name and the contributions they have made to the extent allowed by the law. Any evidence of abuse will be reported as required by law. Identifiable personal information about the participants such as age, date of birth, name, address and phone number will be kept confidential. Information regarding culture, religion, social status, medical history, and a hospital or student number will not be collected. Each participant will be assigned a code number and that number will be used on all data pertaining to each participant. The tapes of interviews, records and transcriptions will be stored in a locked filing cabinet in a secure office.

**Interview of Employees about their Company or Agency:**

Not applicable. Agency employees will not be interviewed.

**Inclusion of Names of Participants in Reports of the Study:**

The names or initials or other identifiable personal information of the participants will not be included in the reports of the study.

**Contact of Participants at a Future Time or Use of the Data in Other Studies:**

Participant contact information will be kept for the duration of the study with the permission of the participants, to allow the researcher to contact participants to provide them with the opportunity to review transcripts and relevant parts of the dissertation prior to completion. Sandra Ollech will be the only researcher with access to contact information. Contact information will not be kept once the study is completed.

I understand that I may withdraw my participation at any time. I also understand that I may register any complaint with the Director of the Office of Research Ethics.

Dr. Hal Weinberg  
Director, Office of Research Ethics  
Office of Research Ethics  
Simon Fraser University  
8888 University Drive  
Multi-Tenant Facility  
Burnaby, B.C. V5A 1S6  
[REDACTED]

I may obtain copies of the results of this study, upon its completion by contacting:

Sandra Ollech [REDACTED]



I understand the risks and contributions of my participation in this study and agree to participate:  
The participant and witness shall fill in this area. Please print legibly

Participant Last Name: \_\_\_\_\_

Participant First Name: \_\_\_\_\_

Participant Contact Information: \_\_\_\_\_

\_\_\_\_\_

Participant Signature (for adults): \_\_\_\_\_

Witness (if required by the Office of Research Ethics):

Date (use format MM/DD/YYYY): \_\_\_\_\_

Contact at a future time / use of data in other studies: \_\_\_\_\_

## **Appendix D.**

### **Interview Protocol**

#### **Students**

##### **One-on-one interviews**

Written consent for the interview will be obtained prior to the interview– includes purpose of the interview, amount of time for interview, plans for using the results of the interview

##### **Open-ended questions**

Done at the College in a private space or a space of the student's choosing

#### **Patients**

##### **One-on-one interviews**

Written consent for the interview will be obtained prior to the interview– includes purpose of the interview, amount of time for interview, plans for using the results of the interview

##### **Open-ended questions**

Done at a local hospital in a private space

#### **Interview Questions**

- Describe how you use a handheld computer?
- Describe what caring means to you?
- Describe what a caring relationship means to you?
- Describe how the use of the handheld computer supported, interfered with, or made no difference to caring relationships?
- Describe how the use of handheld computers supported, hindered or made no difference to baccalaureate nursing students when learning caring skills?

\*Note all interviews will be audiotaped and transcribed by the researcher

## Appendix E.

### Document Summary Form

Type of Document: \_\_\_\_\_

Title of Document: \_\_\_\_\_

Source of Document: \_\_\_\_\_

Date of Document: \_\_\_\_\_

Date Obtained: \_\_\_\_\_

- Record salient points of the contact
- Number points in order on this sheet and note page number on which point appears
- Number point in text of document
- Attach theme or aspect to each point
- Invent themes where no existing ones apply and asterisk those
- Comment many also be included

| Page | Salient Points | Themes/Aspects |
|------|----------------|----------------|
|      |                |                |
|      |                |                |
|      |                |                |
|      |                |                |
|      |                |                |
|      |                |                |
|      |                |                |

## Appendix F.

### Contact Summary Form

|                 |           |
|-----------------|-----------|
| Type of Contact | Interview |
| One-on-one      |           |
| Who             |           |
| Site            |           |
| Date            |           |

- Record salient points in the contact
- Number points in order on this sheet and note page number on which point appears
- Number point in text of write-up
- Attach theme or aspect to each point
- Invent themes where no existing ones apply and asterisk those
- Comment many also be included

| Page | Salient Points | Themes/Aspects |
|------|----------------|----------------|
|      |                |                |
|      |                |                |
|      |                |                |
|      |                |                |
|      |                |                |

## Appendix G.

### Categories and Subcategories

| Categories  | Subcategories  |
|---|--|
| Context of this case study                                    | How caring was recognized<br>Settings of handheld computer use<br>The nursing program<br>The college and the university<br>The health region |
| Handheld computers supported caring relationships             | Time<br>Be there<br>Acting in the best interest<br>Caring as feeling<br>Talking<br>Caring as doing<br>Self-care                              |
| Handheld computers interfered with caring relationships       | Non-caring<br>Impersonal<br>Draws focus away from the patient<br>Inexperience with handheld computers  |
| Handheld computers made no difference to caring relationships | Reciprocity<br>Sensitivity   |
| Student learning  | Information purposes<br>Nursing knowledge<br>Nursing practice<br>Technical support   |
| Challenges  | Underutilization<br>Cost of handheld computers<br>Lack of policy for handheld computer use   |