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**Nurse Educators' Experiences of Information Technology**

by

**Colleen Jackman House**

**A Thesis submitted to the School of Graduate Studies in partial fulfillment  
of the requirements for the degree of  
Master of Education**

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## **Abstract**

The purpose of this study was to explore nurse educators' experiences with information technology in an undergraduate nursing program. Findings from this study should prove to be informative to other nurse educators in terms of potential uses of information technology, the perceived advantages and disadvantages, and the concerns and perceptions of nurse educators as experienced in their work environments in using information technology.

A phenomenological method was used for this study. Seven nurse educators participated in the study, four in administrative positions and three in teaching positions. Of the four administrative participants, three also had teaching responsibilities. The method of data collection included taped, unstructured interviews of approximately 30-60 minutes in duration. Using a guiding questionnaire, participants were encouraged to freely describe their experiences. Following the first round of interviews, five of the seven participants participated in a second round of interviews for further clarification and feedback.

Van Manen's selective highlighting approach and the Ethnograph software program were used to analyze the data. From this analysis of the data, five common essential themes emerged from the participants' descriptions and interpretations of day to day encounters with information technology. These themes were further subclassified to fully capture a complete understanding of the themes. These themes included:

- (1) Communication: The open door to the world. (a) Accessibility, (b) Acceleration of information, (c) Professional Contact to Colleagues, (d) Professional Growth, (e) Building a Student Community through Technology;
- (2) Time: Ally and Rival: (a) Efficiency of Time, (b) Personal Control of Time, (c) Searching for Time, (d) Professional Time, (e) The Course of Time,
- (3) Need to Learn: Responsibility and Desire: (a) Individual Challenge, (b) Self Satisfaction, (c) Continuous Learning, (d) Daily Learning, (e) Recognition of the Need to Learn;
- (4) Technology: An Everyday Existence;
- (5) Cost: Is it Necessary? (a) Controlling Factor.

The essence of the experience was nurse educators reacting to, and then adjusting to, the entry of information technology into their lives and followed by embracing it for its promises.

The findings indicated that nurse educators had a variety of experiences with information technology. For most, this was a basic, functional, daily working experience. Although others went beyond this, none had fully embraced the technology in their lives. The participants' experience with information technology was mostly positive. The reported benefits from their experiences with information technology included speed, efficiency, access to information and colleagues and personal control in their working environment. The findings indicated some frustration and concern among the participants

because of their perceived lack of information technology knowledge and skill. However, this recognition of lack of knowledge was often the motivation to learn. The participants adjusted to the presence of information technology in their lives through self directed and continual learning.

These findings suggest a need for increased information technology education for nurse educators. Increased access to education would facilitate the educator's comfort with the use of information technology and assist them in keeping current with the fast paced changes in their working environment. More knowledge about information technology on the part of nurse educators would provide nurse educators with opportunities for greater input into the design, development and implementation of information technology in nursing education. As well, educators' increased use of information technology would promote collaboration and unity among nursing communities which will support the future of nursing education. The findings indicated a need for further research of this type to assist with the educators' adjustment and integration of information technology into the nursing education environment.

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## **Chapter I**

### **Introduction**

Information technology manifests itself in the form of computers plus programs used to manage and process information (Graves & Corcoran, 1989). Information technology encompasses the use of computer software and technology for collecting and processing information, word processing, literature searches, the Internet and world wide web access for information, e-mail, and computer assisted instruction that includes tutorial, simulation, and drill and practice. Nurse educators use this technology to communicate and to assist in solving problems and making decisions.

Sibbald (1998) defined nursing informatics as the combination of nursing science, information science and computer science. It includes a comprehension of the kind of information nurses need and use in practice and the means by which the use of information technology can enhance the nursing environment.

The proliferation of information technology in health care has challenged nurses in areas of practice ranging from patient care to education and research. Recent advancements in technology have broadened the base of knowledge and skills that exist within the nursing environment. Nurses continually have developed undergraduate programs that have included new ways to integrate information technology into their curricula. Romano, Damrosch, Heller and Parks (1989) stated, "General guidelines for computer education suggest that undergraduate students should be prepared with the

knowledge, skills and values necessary for the roles as users of information technology” (p.22).

In this study, the concepts of information technology and informatics were linked to create the context in which the participants were able to describe their experiences with using information technology.

There was a significant bank of research which addresses nurses’ attitudes towards information technology, but there were few studies that focus on nurse educators’ perceptions and experiences with information technology. The literature has provided a view that nurse educators would be able to contribute to the importance of information technology’s integration in future nursing curricula. Sinclair and Gardner (1997) pointed out that as nurse educators approach the 21<sup>st</sup> century, education should be preparing students for the eventual exposure to all types of information technology in all fields of health care. This raises some concern as to how many nurse educators perceive themselves as being prepared to teach and work in this wired environment. The information technology readiness of nurse educators may have been an influencing factor on how competent and comfortable they feel in their role of preparing nursing students to meet the challenges of information technology in health care. Twelve years ago, it was noted that nurse educators needed to be cognizant of the prevalence of computers in nursing education and that they had to acknowledge that their possession of computer knowledge and skill is a basic survival skill (Tate, 1986).

More recently nurse educators have become challenged by the pervasiveness of information technology and have started to seek ways to ensure that their students will be sufficiently prepared and equipped to be competitive in the employment setting. It would appear that nurse educators need to be experientially prepared themselves, before they can be expected to teach students the appropriate skills and knowledge.

The focus of this study was an exploration of the nurse educators' understanding of living with information technology in an undergraduate nursing program. This study was undertaken through two rounds of unstructured interviews. These interviews contributed to the completeness of what it is like to live with information technology by uncovering the individual experiences of nurse educators with information technology. Nurse educators articulated their daily experiences of living with information technology through the use of personal and professional stories that revealed their thoughts, feelings and emotions when encountering information technology. A description of a nurse educator's typical day included exploration of their desires, their frustrations, self doubt and their sense of control and self achievement. The participants' phenomenological descriptions led the researcher towards an understanding of what it is like to live with information technology.

### **Background**

There has long been an initiative among provincial nursing associations and nursing education programs to make changes to the basic entry requirements for nurses entering practice. Rapid changes in health care delivery, the trends in illness and health

promotion have made it clear that nurses need to meet the challenges of health care in the future and this requires change in nursing education.

The Canadian Nurses Association, the national governing body for nurses in Canada, initiated The National Nursing Competency Project (NNCP) in 1994 and concluded its awareness in the Spring of 1997. Among the competencies listed for beginning practicing nurses; one competency reflected having information technology knowledge and another competency reflected the importance of possessing basic computer skills. Provincial nursing associations are currently re-evaluating the results from the (NNCP) through using focus groups and surveys. The list of The National Nursing Competencies was revised for circulation and the document is expected to be released in May 1998.

A major responsibility of nurse educators has been to ensure the total preparation of students for the nursing profession. It has been presumed that nurses who are knowledgeable and skilled in information technology would likely be more competitive and marketable for job placements in the nursing field both nationally and internationally. An important component of nursing has been accessing and keeping up to date with important information. Nurses as a group needed to become more conversant with the information technology systems that can provide them with this information. Simpson (1996) stated, "The effective practice of nursing is dependent on the ability of clinical nurses and nurse managers to locate relevant information quickly and interpret it correctly" (p.86).

Henry (1995) observed, “Information technology can provide access to a variety of information resources such as knowledge bases and decision support systems to increase the level of knowledge of the nurse decision maker” (p.1182). Accessing information either through literature searches or through the Internet can provide information that can help nurse educators broaden their knowledge base and expose them to alternative teaching methods which in turn can enhance their teaching and expand their vision of what nursing education can offer.

Few nurses have been able to capitalize on the potential of information technology because they have not been sufficiently exposed to the theory and practical application of information technology in their undergraduate programs. Van Dover and Boblin (1991) identified that nursing students ages twenty to fifty would like more knowledge and skills to prepare them for careers in our increasingly computerized health care environment. Sibbald (1998) predicted a rapid explosion of computer use in nursing however, she cautioned that Canadian nurses may be ill prepared for this change because of the limited number of informatics courses at the undergraduate level.

Examples of nursing programs that offer courses on computer theory and hands on experience (or those which have integrated nursing informatics) are British Columbia’s Collaborative Nursing Program, Athabasca University Centre for Nursing and Health Studies in Alberta, St. Francis Xavier in Nova Scotia and the University of Calgary (Sibbald, 1998).

Karen Abbott, a nurse educator at University College of the Cariboo in Kamloops identified the greatest challenge for the integration of informatics as the lack of trained faculty, availability of resources and national standards, and lack of critical competencies (Sibbald, 1998).

In 1995, a report on the Integration of Computer Technology in School of Nursing Basic Program in Newfoundland was released (see Appendix A). The report recommended the integration of computer content into several courses throughout the new undergraduate curriculum. However, this has not completely materialized and discussions with faculty members within the program gave indication that minor integration of information technology has taken place, but was not reflected in the curriculum in any substantial way.

The increased use of computers in health care has significant implications for nursing education. According to Grobe (1988) "Nursing professional destiny is dependent upon how well professional nurses are prepared for nursing practice and doing research by using computer technology for information - handling tasks and how adequately nursing researchers capitalize on using the technology and techniques to define the body of nursing knowledge" (p.25).

### **Purpose**

The purpose of this study was to ascertain qualitatively the meaning and nature of the nursing faculty's and administration's perspectives on information technology. Through the sharing of nurse educators' life stories a better understanding of the

phenomenon emerged. At the commencement of this research, it was believed that this was the first known study in Newfoundland to describe nurse educators experiences of living with information technology. As well, it was anticipated that the results of this study would help to provide an understanding of the meaning of nurse educators living with information technology in their profession.

It was anticipated that data obtained from this study would provide faculty and administration with information on ways technology has been used in the curriculum and in the educator's daily work, and question nurse educators regarding the required competencies and skill in information technology. As well, four areas of concern for nurse educators have been noted as: (1) their own training, (2) the needs of students, (3) issues associated with hardware and software, and (4) future developments for information technology in nursing education (Sinclair & Gardner, 1997). These served to provide a view that achieving a level of self-confidence in the use of information technology has been considered a professional benefit to nursing education.

### **Rationale**

As of the completion of this study, no research has been reported in Newfoundland on nurse educators' and administrators' experiences with information technology in their work environment. Motivational impetus for this study was fourfold: (1) the limited presence of the integration of information technology into the present collaborative curricula, (2) the changing trends in nursing education and health care toward information technology, with emphasis on quicker access to information and the



expected delivery of excellence in nursing education and patient care, (3) the paucity of qualitative studies seeking nurse educators' understanding and experiences when working with information technology, and (4) personal experience with information technology in the researcher's personal life and work environment.

The first factor that encouraged this particular study was the lack of reflection of integration of information technology in the curriculum of the undergraduate program in Newfoundland. At the start of the study, some students were unable to use word processing, e-mail and access the Internet. There were students observed to struggle with word processing and exemplified their lack of information technology skills when seeking permission to hand write a term paper. Nurse educators, attempted to work with, and most importantly for the benefit of the students, and evaluate the merit of student integration into the world of information technology. They believed that students required a level of comfort and competency in order to effectively care for patients in the modern health care system that included a growing presence of technology.

The second motivating factor was that increasingly information technology had become a tool used extensively in nursing education and in the delivery of health care. The computer has become standard equipment in both the nurse educator's office and in the clinical setting. Quick access to timely information had influenced the way educators taught and changed the method by which nurses delivered health care.

A third factor was that despite an abundance of quantitative studies, there was little qualitative research on the experiences of nurse educators with information

technology that addressed the attitudes of nurses towards the accessibility of information technology to them.

Finally, frequent observations of teaching, and interacting with other educators in the researcher's work environment, provided this researcher with the view that there was a general lack of knowledge about information technology. Generally nurse educators attempted to figure out some aspect of the nursing program they were working with as they continued to perform their other work related duties. Other observations pointed to a conclusion that nurse educators' sense of satisfaction and competence increased with greater use of technology. As they mastered the skills needed to use software and programs, they tended to exhibit greater satisfaction of having access to greater amounts of information. This all contributed to the view that new technology facilitated quick and efficient communication, which was considered essential in nursing.

### **Limitations**

As the use of the phenomenological approach is not without controversy regarding a number of limitations, the researcher took precautionary steps to follow all standard procedures for conducting phenomenological research. Nevertheless, some limitations were evident. In this study, purposive sampling was used. The sample was invited to share their experiences in an undergraduate program with the phenomena information technology. Participants in this study provided descriptions of their history of using information technology. Their ability to articulate their understanding of living with information technology was a limiting condition. The possibility of over

representation or an under representation of prevalent conditions that exist in the nursing profession may have occurred. The extent of homogeneity of the population may have contributed to bias.

There was a broad variance in the level of knowledge and use of information technology among the participants. Some participants acquired their knowledge of information technology from formalized courses, others were self taught or learned from colleagues. The method with which each participant learned how to use and the variation in utilization of information technology may have influenced their perception of the experience.

The study involved nurse educators from three different sites each with different technology resources. This variance in the available resources may have influenced the participants' experience with information technology and the resulting data obtained in this study. Having more information technology resources may have led to more comfort and usage, whereas fewer resources may have decreased comfort and limited usage.

Being cognizant of information technology as an essential aspect of today's educational environment, participants may have felt compelled to answer the questions and be seen in a favorable manner by their peers. As well, the professional relationship between the participants and the researcher may have influenced the participants as they related their experiences with information technology.

### **Delimitations**

The eligibility criteria established for selection of participants for this study restricted the population to a homogeneous group. The criteria included only those participants who had previous experience and current experience with information technology. Potential participants who had limited experience with Information Technology (IT) were not included in the study. This delimitation decreased the chance of extraneous variables influencing the results of the subject.

The guiding questionnaire used for data collection may have influenced the response of the participants. The data collection instrument used broad unstructured guiding questions. These questions may have influenced the direction of the interview.

### **Definition of Terms**

For the purposes of this study, the following terms will apply. It is important that the reader have a clear understanding of these terms:

*E-mail:* Electronic mail is the sending and receiving of information and messages over the network.

*Information Technology or IT:* Refers to those systems, computers and programs used to manage and process information (Graves & Corcoran 1989). It includes the use of software and computer technology, specifically the use of computers for word processing, literature searches, Internet and the World Wide Web access for information, the use of information systems, e-mail and computer assisted instruction (tutorial, simulation, and drill and practice).

*Information Systems:* Are the primary information technology and are usually named to indicate the discipline or function they support. For example, hospital information systems support hospital functioning and manage accounting information (Graves & Corcoran, 1989).

*Nursing:* “Nursing is a professional service. The practice of nursing is a synthesis of attitudes, competencies, and knowledge applied to all aspects of caring for the client’s health (promotion, protection, maintenance, restoration and palliation). It is a goal-directed, continuing and comprehensive service. This service is carried out through collaboration with the client, who is an active participant, and with other health care professionals” (Standards for Nursing Practice in Newfoundland and Labrador, 1995, p.1).

*Nurse Educator:* Refers to full-time faculty members who teach in the first year of the BN (Collaborative) Program. Their areas of teaching include both classroom and clinical. Other responsibilities include membership on various school related committees and scholarly research.

*Nurse Administrator:* This role includes administrative responsibilities throughout the four years of the nursing program. At the time of the study the program was in its second year. Some administrators also assume teaching responsibilities in the classroom.

*Nursing Informatics:* Is considered a specialty that combines nursing science, computer science and information science in processing and managing data and

information to support nursing practice, administration, education, research and the expansion of nursing knowledge (Graves & Corcoran, 1989).

*Undergraduate Nursing Program:* A four year university based program in which the graduate is awarded a bachelor of nursing or bachelor of science degree in nursing. This has been recommended as the minimum requirement for entry to practice for nurses in Canada by the year 2000.

*World Wide Web:* A system that enables quick and easy access to multimedia resources, and a system that permits entry to network resources from multiple entry points.

## **Chapter II**

### **Literature Review**

This chapter is a review and synopsis of the current research relevant to this thesis. The review focuses on 4 main areas: (1) the attitudes of nurses towards computers and information technology; (2) the nurse educator's perspective on information technology in nursing education; (3) information technology applications in nursing education; and (4) information technology applications in nursing practice.

#### **Attitudes of Nurses Towards Computers and Information Technology**

Although there has been exhaustive research conducted on nurses' attitudes and other variables that may impact upon the attitudes of nurses towards computers and technology, the results have been inconclusive. Variables such as age, educational preparation, area of work, length of nursing experience and computer use experience have been studied.

For example, an early study conducted by Krampf and Robinson (1984) reported that age affected the nurse's attitude toward computerization. The younger the nurses, the more positive their attitude towards computerization (Friel, Reznikoff & Rozenberg, 1969). More recent studies have indicated that the age of nurses did not affect their attitude towards computer use (Bongartz, 1988; Brodt & Stronge, 1986; Burkes, 1991; Scarpa, Smeltzer & Jaison, 1992 & Sultana, 1990). However, a study of staff nurses by Simpson and Kenrick (1997) using the Stronge and Brodt (1985) instrument found that 54.3% of nurses had a positive attitude towards computer use. The findings indicated

that younger nurses had more positive attitudes towards computers than their older counterparts.

McBride and Nagle (1996) examined factors that influenced nursing students and nurses' attitudes towards computers and as well tested the psychometric properties of Brodt and Stronge's (1986) Nurses Attitudes Towards Computerization Instrument (NATC). The study reported that both groups had a moderately positive attitude toward computers. However, McBride and Nagle (1996) raised some concern regarding the construct validity of the Brodt and Stronge (1985) instrument because of the lack of consistency of the emerging factor pattern in their study.

Studies on the effect of educational preparation on nurses' attitudes toward computers have also been inconclusive. Brodt and Stronge (1986) concluded that a correlation existed between educational preparation of nurses and positive attitude towards computerization. They also found that nursing administrators with a higher educational level offered a stronger rationale for inclusion of computers. Yet, more recent studies indicated that education preparation did not correlate with a favourable attitude towards computers. Burke's (1991) study of the relationship among nurses' use of computerized nursing programs and related variables of knowledge, satisfaction, beliefs, motivation and characteristics such as age, educational level, amount of computer experience, and nursing related computer knowledge indicated no significant correlation between greater educational preparation and nurses' positive computer attitudes.



Sultana's (1990) descriptive study replicated the Brodt and Stronge (1986) study. She examined the attitudes of nurses towards computers in clinical practice and disagreed with Brodt and Stronge's findings. Sultana also reported that the educational level did not correlate with a favourable attitude towards computer use (Simpson & Kenrick, 1997).

The findings of studies on the relationship between the length of nursing experience and a positive attitude towards computer use have not been consistent. Brodt and Stronge (1986) noted that nurses with greater than 21 years of nursing experience had positive attitudes towards computer use and nurses with fewer than 10 years of nursing experience were less positive. In comparison the Bongartz (1988) study, which measured the attitudes of staff nurses in groups of users and nonusers of computers, found that there was no correlation between the number of years worked in nursing with the total attitude score (Sultana, 1990; Scarpa et al., 1992). Contradicting Brodt and Stronge's (1986) study, Simpson and Kenrick (1997) found that nurses with less experience as trained nurses had more positive attitudes towards computer use.

There is little agreement among studies that the area of work in the nursing profession influenced the nurses' attitude towards computer use. Brodt and Stronge (1986) noted that the most approving attitudes were among those nurses working in Rehabilitation, Pediatrics and in Nursing Administration. They reported that nurses working in medical-surgical areas had fewer positive attitudes toward the use of computers. Simpson and Kenrick (1997) reported that nurses who worked in the elderly

care unit, rehabilitation and medicine had more negative attitudes. Yet other studies found that the area of work did not affect the nurses' attitudes towards the use of computers. Sultana's (1990) study classified the participants according to the clinical area they worked on such as medical, surgical, general theatre, recovery unit and ophthalmic unit. He found no significant differences ( $p > .05$ ) among the computer attitudes of the groups (Burkes, 1991 & Scarpa et al., 1992).

The attitudes of nurses have been identified as the key variable for successful implementation of clinical information systems (Brodt & Stronge, 1986). Yet, studies on the relationship of nurses' attitudes towards computers use and their interaction with computers have also been inconclusive. Brodt and Stronge (1986) found that there was no relationship between the attitude of nurses towards computer use and the nurse's amount of interaction with computers (Sultana, 1990). In comparison, Bongartz's (1988) study found that nurses in the computer nonuser group had a more favourable attitude towards computers (Burkes, 1991). However, Schwirian, Malone, Stone, Nunley and Francisco's (1989) study used a revised Brodt and Stronge (1985) instrument to compare the attitudes of nurses and nursing students towards computer use and found that the greater the nursing student's computer exposure, and familiarity with computers, the more positive the attitude (Scarpa et al., 1992).

Other, more recent studies have found that nurses with previous computer experience had an overall positive attitude towards computers. The Scarpa Smelzer et al., (1992) study using the Stronge and Brodt instrument appraised the computers attitudes of

head nurses, staff nurses and licensed practical nurses. They reported a significant finding ( $p < .001$ ) that nurses with previous computer experience had an overall positive computer attitude. Agreeing with this earlier study Simpson and Kenrick's (1997) descriptive study also found that nurses with overall positive attitudes towards computers had previous computer experience ( $p < .0001$ ). Ngin, Simms and Erbin-Roesemann (1995) investigated the relationship between work excitement and level of self-perceived computer skills among nurses and found that computer users were more positive than nonusers. Contradicting these studies, McBride and Nagle (1996) reported that there was no relationship between computer experience and a nurse's attitude towards computer use. However, the study also noted that the nurses' computer experience was mostly comprised of word processing and that may have resulted in a poor understanding of the benefits and barriers associated with computer use.

Many of the previous studies used and questioned the construct validity of the Stronge and Brodt instrument. Murphy, Maynard and Morgan (1994) questioned the validity of the Brodt and Stronge (1986) instrument entitled Nurses' Attitudes Towards Computerization (NATC) (McBride & Nagle, 1996; Scarpa et al., 1992). They attributed the inconclusive results obtained from the instrument to the diversity in nursing populations that were used within the studies. These had included nurse educators, clinicians staff nurses, licensed practical nurses and nursing students.

Studies on nurses' attitudes towards the use of computers that were reported in the last 25 years have provided contradictory findings. Variables such as age, educational

preparation, years of nursing experience or clinical area of work have not been conclusively linked to a positive or negative attitude towards the use of computers among nurses. It would appear that the ubiquitous presence of information technology in health care today might diminish the need for more research on nurses' attitudes towards use of computers, particularly because of the commonly accepted reality among nurses is that further research on nurses' attitudes may not necessarily contribute imperative knowledge in the area.

### **The Nurse Educators' Perspective on Information Technology**

Studies in nursing education provide evidence of a diversity in perceptions among nurse educators concerning the inclusion of information technology in university schools of nursing. The presence of computers has been recognized as apparent in most hospitals and nurse education environments (Saranto & Tallberg, 1998).

A number of studies have reported that information technology is an important component of nursing education and should be included in nursing curricula. Chambers and Coates (1990) indicated that overall, nurse educators were interested in information technology and that they shared a belief that nursing curricula should include computer education. According to their study, 80% of nurse educators in university nursing programs and schools of nursing in the United Kingdom felt that the inclusion of information technology in nursing curriculum was vital. It was noted that 73% of undergraduate programs offered computers in teaching, with 38% of schools of nursing

offering programs which included data analysis, word processing and computer assisted learning programs.

In his 1991 study, Bryson agreed that nurse educators viewed computer literacy as essential to nursing education. However, his study's exploration of the perceptions of nurse educators in terms of the extent of computer training in nursing education provided evidence that only one-fifth of nursing programs had a mandatory computer course in their curriculum at the time of the study.

Bryson's (1991) study also found that nurse educators who had higher levels of familiarity with computer technology viewed it as a useful tool and found it important to integrate into the nursing curriculum. Nurse educators expressed the belief that it was essential for nurses to have knowledge of computer technology and that such knowledge could provide greater opportunities and advantages in the nursing profession.

Heller, Romano, Damrosch and Park (1985) examined the curriculum implications of computer applications in nursing to determine the need for inclusion of computer content in the nursing curriculum. Through a comprehensive literature review, an examination of trends in computer application in nursing and nursing education, faculty interviews from selected education institutions, and site visits to hospitals to observe computer applications in nursing practice, it was determined that preparation of nurses for computer use must begin in nursing education.

Generally, the studies concurred on the point that computer integration should be a component of nursing education. Some studies addressed the nurse educator's level of

computer competence and perceptions for this inclusion of computer education into the curricula. A study by Armstrong (1986) investigated the present and future needs of computer competence for nurse educators teaching in basic and continuing nurse education programs. The findings identified the present competency needs of nursing education curriculum, including how to use a computer as an instructional tool, knowledge of computer technology, the nurse's role when interacting with computer technology, and enhancing the nursing process using charting and care-plans. The identified future competency needs of nurse educators included the computer as an instructional and research tool, evaluation of the influence of computers in nursing, and the involvement of computers with health education.

Sinclair and Gardner's (1997) descriptive study examined the perceptions of nurse educators about information technology issues in nursing education in five nursing colleges in Northern Ireland. It was reported by nurse educators in that country that regular information technology in-service training provided a level of comfort and competence to use computers and educators who received computer training possessed a greater interest in using computers in the classroom.

Delaney's (1989) descriptive study investigated the acceptance of information technology by nurse educators and administration in 36 Baccalaureate nursing programs. A Computer Awareness Survey determined that more than 50% of administrators and faculty and 43.5% of faculty were knowledgeable of education applications. Although only 56% of the schools included computer literacy as an objective in their curriculum,

educators possessed positive attitudes towards information technology. In this study 50% of the schools reported using word processing. A number of other applications such as computerized record keeping, computer-mediated conferencing and e-mail were ranked lower in importance.

In their 1990 study Koch, Rankin and Stewart suggested that the increasing use of computers in nursing education would force nurse educators to re-evaluate their role, their choice of teaching strategies and quality of learning acquired by their students.

The studies were all in agreement in their support of and advocacy of computer integration into nursing curriculum. However, the authors of those studies did not necessarily agree on the method of inclusion and the information technology content in nursing curricula. Chamber and Coates (1996) identified computer literacy as important in nursing curricula. Their study also included other aspects that they felt were important such as word processing, simple programming, data analysis, and computer assisted learning programs. The curriculum involved in that study ranged from total integration of computer content to just some aspects being placed in a course.

Yet another group of studies focused on content for computer use in the curriculum but these were also found to be inconclusive. On balance the findings of these studies suggested that it is important to include information technology in the curricula and also that there are expected computer competency for nurse educators. Sibbald (1998) determined that nurse educators believed that it was important to have their students acquire information technology skills and that teaching these students was

accepted as a responsibility for nurses. An earlier report by Hassett (1984) reviewed the use of computers in nursing education in the 1980's. She reported that nursing faculty are in the illiterate stage and speculated that computers would become omnipresent within nursing education within the next decade.

Nurse educators must learn computer applications to shape nursing preparation and practice for the future. Agreeing with the importance of educating faculty in computer education Heller et al., (1985) reported that faculty development is the essential cornerstone of successful integration of computers into nursing curricula. However, several years later, Sinclair and Gardner (1997) still identified nurse educators' concerns about their own preparedness and lack of information technology training.

Research has indicated that nurse educators acknowledge and recognize the importance of the inclusion of information technology into the curricula. However, it also points us to a lack of congruency of the necessary components and method of inclusion of information technology into the curriculum. Research has indicated the need for a unified policy on the use of information technology in the curricula by nurse educators. Specifically, the aim of further research should be to identify and evaluate information technology content for inclusion in nursing undergraduate curricula and identification of the information competency needs of nurse educators.

### **Applications of Information Technology in Nursing Education**

Nursing is a practice based profession that requires current and reliable information. It must be readily accessible and quick to retrieve and comprised of current



nursing knowledge and research. The following is a review of the forms of computer applications currently being used in nursing education that improve nurse educators' access to information, that enhance the teaching and learning process, promote student's critical thinking and facilitate the educator's and student's contact with colleagues across the control. In this context applications of computer assisted learning, interactive videodisc, computer simulations and computer simulated testing are addressed in the following section.

Using a controlled experimental type study, Schmidt, Arndt, Gaston and Miller (1991) examined the effects of traditional teaching methods as compared to computer managed instruction. Their findings indicated that students did not prefer one method over the other in delivery of the course content and that no statistical differences were identified in the final content achievement scores derived from an experimental group and a control group. In line with the previous study, Lowdermilk and Fishel (1991) used control and experimental groups drawn from baccalaureate nursing students to evaluate the use of computer simulations as a means to enhance computer literacy, facilitate decision making and improve student achievement. Using and comparing pre-test and post-test results both groups were found to perform similarly. Those students who used computer-assisted learning did not score significantly higher than those who did not. However, findings indicated that students had positive attitudes related to Computer Assisted Instruction (C.A.I.) simulations, and 60% of students expressed an interest in future learning experiences using computer simulations.

A later study by DeAmicis (1997) compared the effectiveness of Interactive Video Disc Instruction (IVDI) with traditional lecture/demonstration as an alternative method for learning and performing a critical nursing skill. It was reported that on a re-demonstration of the nursing skill, the mean score of the IVDI students was found to be higher. However, using a t-test statistical analysis, researchers were able to demonstrate that there was no significant difference between the performance of the two groups. Accordingly, both methods could be viewed as being equally effective in teaching this nursing skill. However, 88% of the students agreed that IVDI was a more effective way to learn a nursing skill and that it was recommended by the majority of students who had previously experienced this type of instruction (Walker & Ross, 1995). Similarly, a study by Napholz and McCanse (1994) evaluated the use of an interactive videodisc instruction module on therapeutic communication skills possessed by nursing students. They reported that both the control group and experimental group met the communication course objectives equally well; however, they did find that the use of the IVDI assisted students to meet the course objectives more efficiently. A study by Clark (1991) reported the result of a survey of Interactive Videodisc (IVDI) at 504 National League of Nursing Baccalaureate programs. The reported advantages of the IVDI technology included a more efficient and effective teaching medium for students and an improvement in the ability of the nursing student to independently make clinical nursing decisions without harming the client.

Contradicting the previous studies CAI has been shown to facilitate decision making and positively effect student achievement. Belfry and Winne's (1988) study reviewed 11 independent studies of computer assisted instruction in nursing education. After using qualitative and meta-analytic methods the study reported that nursing students using the computer assisted programs scored higher than students taught through traditional methods (standard deviation, 0.48) and learned the material more efficiently. Overall, students who used a computer-assisted program had a positive attitude.

It is interesting to note that some studies indicated that students preferred the use of these programs over the traditional teaching methods. A study by Russell, Miller and Czerwinska (1994) evaluated the use of a computer assisted instruction program on epidemiology concepts and community health nursing for baccalaureate students. Their findings indicated that 77% of students preferred CAI plus lecture format over the traditional text plus lecture. Thede, Taft and Coeling (1994) through interviews with nursing students who had used computer-assisted programs evaluated elements that facilitate or hindered learning. They reported that computer assisted learning applications integrated into the classroom greatly encouraged student use. Thomson (1998) described use of multimedia techniques in the classroom to teach anatomy and physiology to nursing students. They reported CAI could enhance learning through the creation of an exciting learning environment for the student.

Other studies demonstrated that computer assisted instruction was not only viewed in a favourable light by students but reported increased academic learning and

enhanced clinical practice. Weiner, Gordon and Gilman (1993) evaluated the use of interactive videodisc simulation in labor and delivery on the learning and clinical confidence of nursing students. They reported that students who completed the IVDI simulation and clinical experience in labor and delivery had acquired superior knowledge of these skills compared to those students with only completion of a clinical experience ( $p=.007$ ). It was also reported that these students completing the IVDI program plus the clinical experience demonstrated significantly greater clinical confidence ( $p=.034$ ). Another study supported the use of enhancing clinical decision making and increasing comfort in the clinical area. Weis and Guyton-Simmons (1998) discussed the development and implementation of a computer simulation with associate degree students. Students found that they were forced to interpret data, make independent decisions and develop nursing action plans. Findings revealed that students with increased clinical experience performed better on the test.

A study by Walker and Ross (1995) using a videodisc for learning communication skills also reported positive student learning experiences and attitudes. Using a Likert-scale attitude instrument 78% of the students believed they learned the material better using the videodisc system and 89% reported that they liked using the system. With usage of summative evaluations, faculty reported that students felt better prepared for client interactions in the clinical setting.

Studies on the learning effectiveness of Computer-Managed Instruction have not been conclusive. Research studies supported the concept that students learn just as well using computer-managed instruction as they do with traditional teaching methods.

Khoiny (1995) described factors that influence the effectiveness of computer assisted instruction as a teaching tool. He identified variables that may lead to negative attitudes towards CAI. These included: poor design, lack of feedback on incorrect answers, lack of user control and lack of intellectual stimulation. He suggested that assessment of these variables will assist nurse educators to determine the most appropriate program to fulfill the needs of their students.

Teaching clinical decision making in nursing education has been a challenging endeavor. The use of Computerized Clinical Simulation Testing (CST) was reviewed as a means to facilitate and evaluate the development of the students' decision making. Bersky and Krawczak (1995) discussed the developmental process and the potential for future implementation of a nursing activity database during a CST for nursing students for the National Council Licensure Examination (NCLE). This type of computerized testing permitted the student to carry out a full range of nursing activities without cues. The system also evaluated the presence of independent decision making in simulated client situations. A later review by Bersky, Krawczak, and Kumar (1998) of CST process reiterated the proposed benefits of this testing for students. Beginning in the Spring of 1998 a nationwide Computerized Clinical Simulation Testing began to uncover evidence to support the proposed student competence in clinical decisions making. Depending on

the study's results it was intended that by the year 2001, CST will be a component of the National Council Licensure Examination for Registered Nurses.

Several nursing studies and reviews have centered on other uses of information technology in nursing education. The following section addresses the use of laptop computers, computerized patient care systems and computerized labs connected to hospital information system.

Williams and Benedict (1990) reported on the use of laptop computers and the use of computer assisted instruction among RN students who were continuing their education through distance. Results of this project indicated students' positive attitudes towards computer use and that students enjoyed the time flexibility when using a laptop computer. Birx, Castleberry and Perry (1996) evaluated the computer attitudes, knowledge, and skill level outcomes of undergraduate nursing students who used laptop computer technology in an undergraduate nursing program. There was no statistical significance found between groups on attitude scores using the Thomas "Opinionnaire: Computing in Nursing" instrument. However, it is important to note that both the control group and experimental group had high attitude scores prior to the beginning of the study. Despite this, it was reported that students who used a laptop computer made significant improvements in computer skills with a  $p < 0.05$ .

Strength and Keen-Payne (1991) discussed the implementation of a computerized patient care system in a baccalaureate curriculum. This system was designed for charting at the bedside which included BSU (bedside unit) an (MNP) micro network processor.

As a teaching methodology, students consistently rated the experience of using bedside computers in the skills lab as helpful and interesting. A later study also reported positive experiences by nursing students using computerized charting. Doorley, Renner and Corron (1994) described how the Wright State University-Miami Valley School of Nursing connected the student computer lab to a hospital information system. Student benefits included improved skills for decision making. It provided students with adequate time to develop care-plans and increased exposure to the reality of nursing by allowing students to review care-plans with faculty (Poirrier, Wills, Broussard, & Payne, 1996).

Computer technology in nursing education has long encompassed not only instructional programs for students but also programs that facilitate the challenging task of maintaining student records. Computer managed instruction (CMI) has been used to free up nurse educators' time from much of the burden of paperwork and information processing work. Bingham (1997) described how a computer software program for a baccalaureate science nursing program that uses a university's database for academic advising was developed. It was reported that the time required for processing applications has decreased from 16 hours to 2 hours. This software program allowed easy and quick access to student information for statistical and research purposes and ensured the most up to date information.

Another study that demonstrated the use of computer programs to increase efficiency and effectiveness was conducted by Howse, Smith and Perkin (1994). They

evaluated and compared a manually prepared method of clinical assignments to the use of an automated program designed for making student clinical learning assignments by nurse educators. The study identified the automated system as being a faster and more accurate decision-making tool for clinical assignments. The computer program completed the clinical assignment in 3 minutes whereas the traditional manual method took 5.5 hours. The computer system was reported to be more accurate with a score of 183 points as compared with a total score of 335 points for the manual approach. Their study concluded that with the additional input of some human decision making, that nurse educators found the clinical assignment was less tedious and time consuming.

The use of telecommunications technology in nursing education has included computer-mediated conferencing, e-mail and the Internet. The ability to use a computer network is an important skill that has helped to ensure nurse educators access the most current information and link to other nursing colleagues. Cragg's (1994) qualitative study of a university's nursing course delivered through computer mediated conferencing (CMC) indicated that students initially expressed frustration with the lack of available technical support. However, students reported a feeling of comfort and a sense of self-adequacy when using the technology, together with a feeling of group cohesiveness and efficient use of time.

Todd (1998) described the benefits of e-mail in an undergraduate nursing course as enhancing students' critical thinking skills. He noted that e-mail enhanced the learning process by connecting students and faculty. The majority of students indicated positive



responses toward the use of e-mail and recommended that the use of e-mail as a learning tool be integrated into future courses. Bachman and Panzarin (1998) evaluated the impact of an Internet course on 2 groups of nursing students. Upon completion of the course, findings indicated that the pilot group had a greater number of hours of computer use, a higher level of computer knowledge and a more favourable attitude towards computer use than the comparison group.

Studies on the effects of CAI on student learning have been inconclusive. As many of the studies focused on the effectiveness of learning, nurse educators have been required to know what makes certain programs more effective than others. Rather than solely evaluate instructional outcomes, further research needs to focus on the process of instruction within these programs. Some of the previous articles discussed were based on educators' and students' opinions formed through their use of computer assisted programs. Future research should be based on more formal research studies. Future research is also needed to study the effects of using CAI on students' learning. The utilization of IT applications by nurse educators may generate more timely research and stimulate nurse educators to participate in the design and development of IT applications in teaching.

### **Applications of Information Technology in Nursing Practice**

There have been a considerable number of studies conducted and reviews published that dealt with applications of information technology within nursing practice.

Much of these have focused on the benefits of computer information systems (C.I.S.) for nursing, but the results have been inconclusive.

Axford and Carter (1996) stated “Clinical information systems are large computerized database management systems used by clinicians to access a range of patient data to plan, implement, and evaluate care. Other terms for CIS include patient care information systems, nursing information systems, medical information systems and patient care management systems” (p. 156). Simpson (1996) stated, “The New Hospital enterprise-supported by advanced information enterprise-supported by advanced information technology solutions-promises great advances in providing longitudinal patient care” (p. 85).

Few nurses possess the technical engineering background required to bridge the gap between nursing and computer technology (Hendrickson, 1993). Ten years earlier, Carpenter (1983) reported that a lack of nursing input during system development led to failure of these systems. McFarland (1995) described the progress of the development of expert nursing systems. She emphasized the importance of nurses being computer literate, as expert systems become more prevalent in health care information systems.

Hendrickson (1993) discussed the importance of using nurse engineers in the development process of Nursing Information Systems (N.I.S.) which will improve the quality of these systems by adding nursing knowledge and input into the process. It is suggested that expert system technology will be core components of information systems in the 21<sup>st</sup> century.

Clinical information systems have the potential to save valuable nursing documentation time. A number of studies have examined general or hospital wide clinical information systems and support the potential benefit of saving time when using computer systems. Using a Likert scale questionnaire, Axford and Carter's (1996) study explored the expectations and beliefs of computer users and non-computer users about the effects of computerized nursing clinical information systems on their practice. Slow computer response time was found to have a negative effect on computer users' work. However, the findings indicated a favourable view by all nurses towards using computers and concluded that generally nurses expected positive outcomes in their practice from using Clinical Information Systems. Both groups believed that computers saved time, but that direct patient care was not always enhanced.

Additional support for the use of CIS was found in a comparative study by Minda and Brundage (1994). This study evaluated the time required for documentation of the nursing assessment and the number of observations recorded by the computer were compared with handwritten documentation. A 20% ( $t=4.06$ ,  $p=.0002$ ) decrease in time spent in automated documentation of a nursing assessment was found. A difference of 2.4 minutes was observed between handwritten documentation and automated. This study was limited because of its focus on only one aspect of documentation.

A study conducted in an ICU environment by Marasovic, Kenney, Elliott and Sindhusake (1997) used a comparative observational design and work sampling methodology to compare the use of a Clinical Information System versus a paper-based

documentation process by nurses. This study examined the frequencies of nursing activities when using CIS compared with paper-based documentation. The findings did not indicate a significant difference ( $p>.33$ ) between the potential benefits of automated and manual documentation. However, the study was limited because of not having a full time data observer across all shifts. Moreover, the data collectors often experienced difficulty carrying out their regular duties. The study concluded that additional future research in this area may demonstrate the time saving potential of CIS over paper-based documentation.

The results of other studies supported the proposition that automated documentation of patient care saves time. A study by Adderley, Hyde and Mauseth (1997) reviewed the implementation of a paperless record systems and found that nurses used the extra time for personalized patient care and patient and staff interaction. An earlier study in a general service ward conducted by Pabst, Scherubel and Minnick (1996) reported that nurses who used bedside terminals decreased the time spent in documenting patient care activities by one third ( $9.1\%/13.7\%=.66$ ). It was also found that nurses used this extra time in performing patient nursing care (Saba & McCormick, 1996). A similar study by Meintz and Shaha (1992) evaluated the effectiveness of automated bedside systems. They reported that a reduction in redundant charting and data entry errors and the increase in the timelines of documentation were advantages. However, the disadvantages of these systems were reported as high in cost, plagued with inappropriate software that lacked nursing input and the lack of timely training for staff.

Brown, Cioffi, Schinella and Shaw's (1995) findings contradicted the more recent studies. Their study evaluated the influence of computerized bedside terminals on the proportion of staff nurses time on direct patient care activities. Findings indicated that staff nurses spent 7% less time in direct patient care and that 5% of their time was spent interacting with bedside computers. However, the authors acknowledged that other organizational activities at the time of the study may have influenced the results.

Hendrickson, Kovner, Knickman and Finkler (1995) examined not just one automated system in one hospital but they also studied the perceptions of nursing staff on the impact of hospital wide information systems in several hospitals. Through implementation of nursing information systems, staff nurses were generally more satisfied with the quality of documentation and the automated system allowed for more consistent systematic charting (Brown, 1992). The findings indicated many positive comments focused on the advantages of readability, accuracy and timeliness.

Automation of client care records extended beyond hospital settings into other growing health care agencies. A recent study by Geraci (1997) described the process of automating nursing records in a home care facility and evaluated the process. Staff reported a reduction in nursing time spent on clerical tasks, less duplication of charts and forms, improved communications between departments, improved accessibility to patient records from the field and improved ability to collect assurance data.

Zerwekh and Claborn (1997) stated, "Computers are here to stay, and the efforts in nursing need to include developing techniques that will encourage nurses to become

familiar with computer operations, document reduction in nursing errors and establish a reduction in time spent charting nursing interactions. With the advent of bedside terminals, research will need to validate the computer contribution to nursing productivity” (p. 285).

A descriptive study conducted by Adaskin, Hughes, McMullan, McLean and McMorris (1994) explored and evaluated the experiences of nurses during the implementation of computerization in a large Canadian hospital. After using a grounded theory approach, their findings indicated that there was a general feeling among the nurses of not being involved in the selection of the Hospital Information System. The nurses reported that the system was time consuming to learn and this took away from patient care. They also reported it as an “intense experience” having to learn to use computers in their daily work. However, they did report the benefits that computerization prepared them for the future and they identified aspects such as access to information and keeping up to date as helpful.

Tronni and Welebob (1996) used a non-experimental comparative study to measure nurses’ satisfaction with a patient educational software application and compared user satisfaction with manual versus computer-generated materials. Results indicated a generally higher degree of nurses’ satisfaction with the computer software application. Many hospitals and health care agencies have automated part or all of the client record, yet, no single system is currently available that fulfills all of the functional requirements of the computer based record (Hebda, Czar, & Mascara, 1998).

Another form of clinical information systems are computerized modules that provide uniform documentation of patient education by nurses. Farris, Mendenhall and Mazzuca (1994) described the implementation and evaluation of the computerized Diabetes Education Module for Documenting Patient Outcomes. The study reported the documentation system as being a valuable means for easy and quick documentation and retrieval of client teaching interventions outcomes that facilitated the provision of client teaching. Like modules which are developed for documentation of patient education, there are several studies that focus on the development and use of computer assisted instruction programs for patient education. Patient education has sometimes been sporadic and time consuming for nurses. The use of computer assisted instruction for patients eliminates some of these obstacles and promotes patient learning.

A study by Tibbles, Lewis, Reisine, Rippey and Donald (1992) examined a Computer Assisted Instruction patient education program for pre-operative and post-operative joint replacement patients. The findings indicated that computers provide quality standardized information to patients. The authors reported that the program encouraged patients to work at their own pace and that it reduced the time nurses needed to spend on teaching patients. Their review concluded that although there is currently a limited selection of high quality courseware, CAI patient education programs are a valuable and an interesting means to present patient education content.

An earlier, but similar study, Sinclair (1985) reached the same conclusion in terms of the advantages of computer assisted instruction programs for patient education. The

author reported the benefits of computer assisted programs as ensuring the presentation of standardized information, the constant availability of information to patients regardless of nurse limitations and cost effectiveness. However, the review did acknowledge the disadvantage of patient apprehension toward computers.

Vargo (1991) evaluated the use of a computer assisted program for patient education at an Outpatient Clinic. Some of the content areas included arthritis, cholesterol and walking for exercise. The patient responses through a survey were positive toward the computer assisted program. The findings indicated that users viewed the computer as an interesting tool for learning; they believed they had gained knowledge and some preferred it over having a person teach them. Studies in this area indicated that computer assisted education programs for patient education is viewed favourably by patients and effectively transmits accurate information. The noted limitations from the literature include the restricted availability for selection of software.

Telecommunication resources have been another means by which nursing practice is using technology. Fawcett and Buhle (1995) discussed nurses using the Internet as a data collection tool. They used the Internet to study cancer survivors, and surveyed their experiences of coping with their diagnosis and treatment. Findings indicated that this tool is feasible as a preliminary data collection tool for only those who have the access and capability to communicate electronically. They concluded that some researchers who have used the Internet as a data collection tool have noted a low response rate and limited sample characteristics thereby making generalizations difficult (Murray, 1996b).



A study by Klemm, Reppert and Visich (1998) involving an Internet cancer support group determined the benefits and use of this form of communications for support and information by individuals with cancer. Through a content analysis of the posted messages, it identified the messages as a means of support, a source of information, a medium for personal opinions and sharing experiences, and a voice for encouragement and humor. A noted disability of the use of this medium as a source of information may actually be a source for misinformation. The authors suggested that it has been important for nurses to be knowledgeable about the use of available patient resources on the Internet and the advantages and disadvantages of the Internet to support and help their patients.

Just as the Internet can provide a source of information and a medium for communications for patients, the use of electronic mail can enhance communications among nurses. Stoughton (1996) discussed the implementation of e-mail at three separate sites of a regionalized hospital system. Staff nurses reported improved communications within the department, being up to date and found it a reliable means of communication with other regionalized hospital sites.

According to Hardey, 1996:

The nature of the nursing knowledge base has been much debated and one clear conclusion that emerges from this debate is that the profession is multidisciplinary in nature and supported by a number of underpinning disciplines. The emergent

academic world mediated by the World Wide Web will promote interdisciplinary work and the seamless flow of information exchange (p. 5).

Research in validating the effects of using Clinical Information Systems on nursing productivity, patient outcomes and cost effectiveness have been inconclusive. Therefore, more research is warranted in this area. While the use of the Internet and on-line activities were used by nurses, use appears to be at an infancy stage. As use by nurses increases over time, it may be anticipated that research on the effects on using the Internet on nursing practice may evolve.

### **Summary**

Although a number of studies have surfaced, research on nurses' and nurse educators' attitudes towards computers has been inconclusive. The influence of variables such as age, educational level, experience in computer use and years of nursing experience on nurses' attitudes has been inconsistent. While the majority of recent studies reported favourable attitudes towards computerization, there are questions concerning the validity of the widely used Stronge and Brodt (1985) instrument. Generally, an interesting finding was that nurses' negative attitudes toward using computers were attributed to their lack of computer knowledge, their manner of current use of computers and their possible future use.

On the other hand, nurse educators have clearly indicated that it is essential for them to be properly equipped, prepared and ready to teach computer skills to their students. Those with some type of computer training reported enhancement of their

comfort level with using computers. The competency needs for nurse educators included the use of the computer as a research and instructional tool, awareness of the role of the computer in nursing and possession of knowledge about the potential roles of computers in health education.

Many different types of computer applications were used in the nursing profession. The most common applications are computer assisted instruction, interactive videodisc, computer simulations and proposed exam computer simulations. Research on computer assisted instruction applications reported both advantages and disadvantages. The results predominately demonstrated that students' attitudes were favourable toward computer applications and that similar levels of student content achievement could be attained through either the traditional or the computer method.

It was evident from the number of hospitals using computer systems that computers have become an emerging force in healthcare. Some of the common advantages of clinical information systems are: the increased time nurses spend with clients, quicker access to information, enhanced quality of documentation, and improved communications. Research has also indicated that it is important that designers be aware that nurses are not data entry specialists but providers of care. Therefore, systems that involve design input from nurses and include features that are easy to learn and use were deemed important.

While the use of the Internet was found to be growing among the nursing community, it was viewed as still in its infancy stages. Studies indicated that while

nurses are becoming more involved in many aspects of information technology, some areas received more coverage. Nurses and nurse educators were beginning to understand and critically select information technology programs to address specific teaching strategies and needs.

An understanding of attitudes of nurses towards the use of computers, the perceptions of nurse educators towards information technology, and the role of information technology in nursing education are essential components to a complete understanding of nurse educators' experience with information technology in an undergraduate nursing program. There have been many quantitative and descriptive studies examining the use of information technology in healthcare. However, this review of the literature failed to uncover any studies that used the phenomenological method. The previous findings have not provided specific direction towards a true understanding of nurse educators' experiences with information technology. Previous research has shed light on information technology use in nursing, but the research has focused primarily on collection of objective data such as performance statistics and observations of behaviour and reactions' of nurses and nurse educators towards information technology. Very limited research has focused on the true understanding of a phenomenon that only comes from exploring a personal experience.

Nurse educators have the first opportunity to influence and guide future practicing nurses. Understanding nurse educators' experiences with information technology should assist in the illumination of how best to introduce nurses to this increasingly technology

environment and facilitate an understanding of the computer content which ought to be included in nursing curricula and the current and future use of computers by nurses and nurse educators in practice.

Chapter III presents the phenomenological method and the method used in this current study.

## **Chapter III**

### **Methodology and Phenomenological Method**

This study was a phenomenological inquiry with emphasis on the description and interpretation of the lived experience of nurse educators with information technology in an undergraduate nursing program in Newfoundland and Labrador. Phenomenology long has been recognized as both a philosophy and a method having its primary focus on the practical world of the lived experience, from the perspective and meaning of the person experiencing it (Talbot, 1995).

The phenomenological qualitative method was chosen to allow nurse educators to articulate their lived experiences with Information Technology with emphasis on their experiences with colleagues and nursing students. Burch's (1985) thesis stated, "The use of technology is non neutral. It transforms experience, whether for better or worse, and ultimately shapes human thinking and being" (p. 25).

This chapter is divided into two sections: (1) The Phenomenological Research Approach, and (2) Methods. The first section discusses phenomenology and specifically Van Manen's human science research. The second section discusses the various methods followed by the researcher throughout the study.

## **Phenomenological Research**

Phenomenology has been variously defined as: A research method that explores the humanness of a being in the world, an interactive involvement of both the “researcher” and the “researched”. “Phenomenological research is a human science which strives to interpret and understand rather than to “observe and explain” (Bergum, 1989, p. 43). The study of phenomenology involves the appearance of the phenomena and the discovery of the essence underlying the phenomenon as the ultimate purpose of the phenomenological philosophy (Baker, Wuest & Noerager Stern, 1992).

Phenomenological inquiry is the search for the fullness of living, it attempts to explicate the meaning as participant’s live in their everyday existence, the lifeworld (Van Manen, 1990). These concepts articulate phenomenology’s ultimate aim of describing, interpreting and capturing a deeper understanding of the nature of the participant’s everyday experience with the phenomenon.

The phenomenological researcher’s focus of inquiry is dependent on a person’s perception, description and interpretation of their lived world and eliciting this understanding through linguistic expression. With this focus the researcher’s inquiry is centered on a person’s everyday experience with the identified phenomena and how one interprets those experiences. With this approach the researcher searches for deeper meaning in the participant’s lifeworld. Husserl (1970) believed the lifeworld “is the world as we immediately experience it pre-reflectively rather than as we conceptualize,

categorize, or reflect on it” (as cited in Van Manen, 1990, p.9). Phenomenological inquiry involves learning and gathering insights about the everyday experience through coming into direct contact with people in their life world.

Phenomenology includes the study of the nature of the human being. Van Manen (1990) concluded that this can be accomplished through the principle of “intentionality”, the intentional and conscious act of attaching ourselves to and becoming that world. Questioning the very nature of the world connects the researcher to that world and makes us conscious of the fundamental aspect of reality.

To help maintain a consciousness and an understanding of the human being, Van Manen (1990) described four existential elements that aid the researcher in the course of searching, describing, interpreting, and reflecting upon the participant’s life world. Van Manen (1990) listed the four existentials as: (1) lived space (spatiality); (2) lived body (corporeality); (3) lived time (temporality); and (4) lived human relation (relationality or communality). These existential life themes form the underlying groundwork of phenomenological research that guides the researcher in his or her interpretation of the participants’ descriptions of their lived worlds. Van Manen (1990) described the four existentials that subsist in human beings in their lifeworld as: (1) lived space, being a participant’s impression of their environment; (2) lived time, as the participant’s sense of past, present, future, duration and lastingness; (3) the lived body, as their awareness of the person’s unique thoughts, emotions and physical sensations in its alliance with the



phenomenon; and (4) lived relations, as the participants' sense of shared connection with others. Acknowledging these four existentials assisted the researcher in bringing about an exhaustive description of the participants' feelings, thoughts, interpretations and meaning of their lived experiences with information technology.

A task that was central in the phenomenological tradition was to construct an interpretation of the essence of a human experience. To animate the participants' perspectives, the researcher must remain true to the participants and their experiences. One way to achieve this is through the process of reduction.

Baker et al. (1992) described reduction as having two steps "first, preconceptions about a phenomenon being investigated are bracketed by being identified and put aside, secondly, the phenomenon is varied imaginatively in order to identify its characteristics attributes.... Reduction leads to the uncovering of the essential structure, the essence of the phenomenon experienced" (p. 1356).

In the current study, reduction was achieved through the process of "bracketing". Van Manen (1990) described this as the act of suspending one's various beliefs in the reality of the natural world in order to study the essential structures of the world" (p. 175). In this case, the researcher's own experiences and perceptions of information technology were brought into consciousness and then put aside. The researcher approached the phenomenon with no preconceived ideas or opinions about the

phenomenon. Only the participant experiencing the phenomenon can reveal its true reality.

The phenomenological researcher must hold no preconceived notions regarding the phenomena under study. The researcher must maintain openness to the perceptions of those experiencing the phenomenon, carefully analyze and come to an understanding of the complexity of the phenomenon. Overall, the researcher must be intuitive, enthusiastic, and view the world with a wide open mind. Only by suspending the researcher's feelings, expectations and scientific theories of the phenomenon and striving to see beyond the specifics of an experience to the possible universal experiences of others, can the researcher understand the essence of the phenomenon. The sole task of the phenomenology researcher is to question, uncover and understand meanings embedded in the practices and expressions of those people under investigations (Wilson, 1989). This task will bring the researcher closer or in direct contact with the participant's life world.

In the phenomenological tradition there are no set procedures or methods to guide the researcher, the researcher must remain oriented to discovery. Van Manen (1990), however, suggested six research activities as a guide to pursuing phenomenological human science research. Initially, the researcher should identify a phenomenon he or she finds intriguing. Information technology initially intimidating, had become an essential and practical part of the researcher's everyday world. However, as researcher, one must

be vigilant in being mindful that the experience with this phenomenon may not represent a universal experience.

Secondly, the researcher should explore the phenomenon as thoroughly and as fully as possible by obtaining experiential descriptions through unstructured interviews. General guiding questions were targeted toward exploring and understanding the lived experiences of faculty and administration through an attentive thoughtfulness. In the role as researcher, it was important to view the participant as central in the environment, with each person experiencing his own reality. This individual reality is considered subjective and unique to the individual (Burns & Grove, 1993). The researcher needs to be vigilant in attempting to minimize the impact of her preconceived notions, in terms of conceptualization of the phenomenon, upon the data collection process.

The use of open questions in this study facilitated the gathering of data on the perception of the person experiencing information technology in a nursing education program. These guiding questions encouraged a retrospective reflection of human responses such as frustration, concern, fear, enthusiasm and satisfaction in a relationship in the context of the participants' life experiences. The discovery of these experiences with the phenomenon was achieved through a collection method that described an experience without a prior conceptual framework to identify the essence of the experience (Roberts & Burke, 1989).

The relaxed atmosphere of the interviews and the open-style questions sometimes caused the participants to stray from the topic and to discuss unrelated information. The researcher attempted to reorient the participants by focusing them on the central question of the study; “What is it like for nurse educators to live with information technology?” Through observations, questioning and reflection, the researcher became a direct participant in the participant’s world as they related their stories. Phenomenology as a human science approach is rooted in the philosophy of the researcher attaching him or herself to the world and fully becoming a part of the world (Van Manen, 1990).

The third activity was to identify through thematic analysis the essential themes from the experiential descriptions. Through listening and relistening to the audiotapes while concurrently reading the interview transcripts the essential themes began to emerge. Oiler (1982) stated, “as descriptions are compared and contrasted recurring elements are noticed. This allows for identification of the ingredients of the phenomenon and the way the ingredients of the phenomenon relate to each other” (p. 180). As well, discussing the themes with an advisor sometimes brought to light issues that had been obscured by the researcher’s own proximity to the participants’ world. Keeping in contact with the participants and sharing with them the initial analysis confirmed the true reflection and meaning of the experience.

The fourth activity involved an intensive reflection that led to an understanding of the internal structures of meaning that comprised the participants’ world. Part of this

reflection caused the researcher to step away from the lifeworld temporarily only to ensure that a true interpretative reflection of the person's world became evident in the writing.

The fifth activity involved writing, reading and rewriting the words; only then did the language begin to speak the world of the participants. Sometimes it is difficult for the writer to express the concepts and attitudes, therefore in the research writing process it is necessary for the researcher to "borrow" the words of the participants (Van Manen, 1990). This "borrowing" presented a directness, authenticity and a sensitivity that would be beyond the capabilities of the writer. Finally, this long process led to viewing and reflecting on the experiences, not as isolated units of meaning but rather as the deeper totality of the nature of the phenomenon as it began to emerge. Oiler (1982) stated, "The last essential operation in phenomenological method is a description of what has been seen, the goal of describing is to communicate; to guide the listener by giving distinctive guideposts to the phenomenon" (p. 180). The writing does not speak to the experience but rather it grasps the very nature of the wholeness of the participants' world.

### **Methods**

This section consists of and describes the participants and sample, ethical considerations and methods of participant selection, data collection, data analysis techniques and theoretical considerations.

## **Participants**

In this study the participants were all faculty and administrative members who had experienced or used information technology in an undergraduate nursing program. The selection criteria for the participants included: (1) those individuals with a background or history in using information technology; (2) individuals who presently have encountered and used information technology within their lifeworld; (3) participants who had worked in the undergraduate program for at least one year; (4) participants who could recollect, relate and articulate their lived experience with information technology; (5) those who could speak and understand spoken English; and (6) those who wished to participate in the study and who were inclined to share their experience with the phenomenon.

The reasons for establishing this criterion included: (1) the phenomenological research approach required that participants have experience with and knowledge of the phenomenon being studied; (2) individuals who are presently living with the phenomenon in their everyday existence can share and attempt to explicate the meaning of the phenomenon; (3) individuals could reflect on the lived experience and were able to relate their personal understanding, interpretation and meaning of the phenomenon; (4) it is important that individuals are capable of freely describing their experience and accordingly enhance the understanding of the phenomenon; (5) participants and the researcher must both comprehend the same language to ensure things are understandable

to each other; and (6) participants who permit us to borrow their experiences and their reflections on those experiences enable the researcher to formulate a deeper meaning of the phenomenon.

### **Sample**

In this study, purposive sampling was used to ensure a sample of knowledgeable individuals (Polit & Hungler, 1993). Mays and Pope (1995) stated that systematic, non-probabilistic sampling is important in order to “identify specific groups of people who either possess characteristics or live in circumstances relevant to the social phenomenon being studied” (p.110).

The purposeful sample included those individuals who are knowledgeable about the use of information technology and who have experienced and encountered information technology in their lifeworld. Mays and Pope (1995) stated “This approach to sampling allows the researcher deliberately to include a wide range of types of informants and also to select key informants with access to important sources of knowledge” (p110). Participants who have a lived experience will draw the researcher into their unique insights and provide the researcher with their interpretation of and reflections on the phenomenon. Appleton (1995) stated, “it was essential that the researcher select a sample who could articulate their thoughts and experiences and thus enhance the researcher’s understanding of the concept” (p.994).

Initially, the sample size in this study was difficult to determine because the purpose of this phenomenological research was to continue until an understanding of the phenomena occurred. The sample size is adequate when the meanings are clear and the data are fully explored (Polit & Hungler, 1987).

In this study, the researcher stopped seeking additional key informants when theoretical saturation was obtained. Theoretical saturation is determined when specific categories consistently emerge and less and less new information is uncovered and explored (Talbot, 1995).

The sample size included eight first year nurse educators and administrators who were to recollect and reflect on their experiences with information technology. However, only seven of the interviews were used in the analysis. Due to the nervousness of one of the participants, the brevity of the interview and technical difficulties, it was decided by the researcher and the advisor not to use this interview as a data source.

In qualitative studies a sample size of 5 - 30 has become the trend, a sample size smaller than this may cause the idiosyncrasies of meaning and often it becomes easy to identify the subjects (Roberts & Burke, 1989). Knowledgeable participants were able to describe, share and capture the profundity of their thoughts and personal experiences in their lived world.

Key participants were chosen from the three sites offering the Baccalaureate (Collaborative) Nursing Program within the province of Newfoundland and Labrador.



These sites included Memorial University School of Nursing in St. John's, The Centre for Nursing Studies in St. John's and Western Regional School of Nursing in Corner Brook. Permission was obtained by writing to the individual directors of nursing from the three sites to access administration and full - time faculty of the BN (Collaborative) Program (see Appendix B & C ). After permission was obtained, consent forms were distributed to all full-time faculty involved in the first year of the BN (Collaborative) Program. Because of the researcher's association with the three sites it was easy to contact and access faculty and administration from all three sites.

### **Ethical Considerations**

Permission to conduct this qualitative phenomenological study was obtained through The Ethics Review Committee, Faculty of Education of Memorial University of Newfoundland and Labrador (see Appendix D).

The consent form identified the purpose of the study, the possible benefits for both nursing education and the participant, the type of interview and the approximate required time needed, permission to audiotape the interview and measures to maintain anonymity of the participants. In addition, the form explained the participants' freedom to withdraw from the study at any time.(see Appendix E).

Prior to each interview, participants were advised of the measures which would be employed to maintain their anonymity, such as the use of codes rather than names to identify tape recordings and transcriptions. They were also told that experiences would be

described in such a manner that identification of the participants would be unlikely. A copy of the interview transcript was sent to each participant. Participants were told that even though they would not directly benefit from the study, that they might indirectly, because of the possibilities for enhancement of the delivery of nursing education.

### **Participant Selection**

Faculty and administration who have used information technology or experienced information technology within their roles as nurse educators were intentionally selected for this study. Swanson-Kauffman and Schowald (1988) stated that “the empirical phase begins with identification of the population from which subjects will be selected.... the population is chosen for its members’ experience with the phenomenon or condition of interest” (p. 100).

To identify the appropriate participants for the interviews, information was obtained from first year faculty and administration’s demographic data obtained from a colleague’s quantitative survey of the faculty’s and administration’s need for information technology in the BN (Collaborative) Program in Newfoundland and Labrador. The information from this survey served two purposes: (1) to select the most appropriate faculty to participant in the in-depth interview; and (2) to provide direction and guidance to the in-depth interview.

The survey consisted of questions related to demographic data addressing age, sex, educational preparation, clinical area of expertise, years of teaching in a BN

(Collaborative) Program, prior experience with computers, prior instruction in computers, self-rating of computer skills, and frequency of computer use. These demographic information allowed the selection of faculty and administration who have had experience with information technology and to include participants with a diverse range of experience with the phenomenon.

### **Data Collection**

The selected participants were contacted through e-mail, telephone and directly. Arrangements were made with each of them regarding the date, time and place that was convenient for both the researcher and the participant. Interviews were conducted in the most convenient and comfortable place for the participants. Six of the eight interviews took place in the participants' office, two interviews were conducted in the researcher's office. The purpose of conducting interviews in the most natural setting for the participants is to ensure that where the participant lives and where the phenomenon occurs remains stable and natural (Streubert & Carpenter, 1995).

All interviews were taped and then transcribed by an individual who was experienced in the verbatim transcribing of interviews for content analysis. Data were collected through tape recorded interviews lasting from 30 to 60 minutes. The duration of the interviews depended on the experiences of the participant, her communication style and the participant's response to the interview. For three to five minutes preceding the interview, participants were encouraged to ask any questions or concerns they may have

had regarding the course of the research study. Prior to the interview participants were also provided with a definition of information technology that was specifically related to this study (see Appendix F). These preliminary discussions helped clarify any misunderstandings and uncertainties the participant may have had in connection with the definition of information technology.

This study used the data collection strategy of unstructured interviews. The unstructured, open approach succeeded in facilitating the participant's ability to relate their experiences from their own perspectives. The unstructured interview was conducted using a questionnaire guide of five open ended or broad questions designed to channel the dialogue (see Appendix G). Swanson-Kauffman and Schonwald (1988) believed that "The interview schedule serves only as a prompting device, the types of questions included are meant to be provocative and a creative means of getting informants to talk about their own experiences of the phenomenon" (p.100).

Initially, 15 questions were formulated for the interview guide. Three individuals with considerable experience in phenomenological research (including one with expertise in information technology) were asked to provide feedback regarding the quality and appropriateness of the questions. Each individual was sent a letter explaining what was required of them as well as criteria to follow to assist in critiquing the questions (see Appendix H and I). All three individuals suggested that the questions should be reduced to four to five broad reflective questions that would help achieve an understanding of the

participant's description and understanding of the phenomenon. It was anticipated that this would help elicit a personal perspective from the participant, but it would reduce the interview time and avoid repetition by the participant. Upon reviewing all three individuals' suggestions the researcher began to refine and edit the questions. The final interview guideline included five broad questions that sought out the significance of the human experience. The central objective of the interview was to encourage the participants to freely describe their experiences and to explore their interpretations of their experiences.

Prior to beginning the first interview, guiding questions were piloted with a faculty member from the BN (Collaborative) Program who had experience with information technology. This faculty member was not included in the study. From this verbal feedback, wording and sequencing of the questions were modified. This pre-interview enhanced the researcher's confidence in the questions and assisted in the refining of interviewing skills.

Throughout, the researcher strived to be flexible, intuitive, completely open minded and to explore the participants' understanding in the context specific situation. Encouraging elaboration of a particular topic by being responsive to the participants' verbal and nonverbal communication and encouraging further discussion through the use of verbal and nonverbal cues. The researcher encouraged the participants to voluntarily

discuss any thoughts that occurred to them throughout the interview in order to fully explore and describe their experiences.

The general atmosphere of privacy and comfort in the participants' natural environment encouraged freedom of speech and expression. Following each interview field notes were written to supplement the taped interview and to record observations of non-verbal cues during the interview and the researcher's personal thoughts with respect to the interaction. This record of nonverbal cues was used in the analysis to help stimulate thought and insight, and to assist in recalling the tone and setting of the interactive experience.

### **Data Handling**

Qualitative analysis involves an inductive approach, or developing generalizations from specific observation (Polit & Hungler, 1993). The starting point for this inductive analysis was observation followed by an attempt at clarifying emerging themes shared by the participants. These themes were identified through a process of coding raw data and an analysis that involved intuition and meaningful interpretation of the data sources. The final data analysis should lead to a complete understanding and interpretation of the phenomenon being studied in its specific context.

Qualitative research can expose and explore unstructured information without removing it from its context and complexity. As individual interviews were completed the tapes were transcribed verbatim and coded with numbers that protected the

participant's anonymity. The audiotapes and matching transcripts were repeatedly reviewed. This allowed for correction of errors such as missing words or spelling inaccuracies. More importantly this listening and relistening provided an insight into the entire experience in a global context rather than as balkanized fragments of the participants' experience. Through this process the researcher was able to become totally immersed and felt a part of the data being analyzed. The analysis required continuous and direct contact with the data and only then did insight into the true meaning of the data begin to emerge. Following the transcription of the interviews, each participant was provided with a copy of their interview transcript and asked to provide further clarification and feedback if they believed it was necessary. Van Manen (1990) recommended sending individual transcribed interviews to participants for further clarification and feedback.

Copies of the transcripts were also provided to the advisor and a member of the committee in an effort to confirm that the transcribed conversational dialogue revealed the participants' true reflection of their experiences and that the content of the transcribed interviews was sufficient. Van Manen (1990) recommended sending the transcripts to the advisor and members of the review committee for informal interpretative insights of the research text. This review assisted in identifying the strengths and weaknesses in the conversational dialogue of the participants and assisted in the development of further questions to help in the second interview of each participant.

Following this, further feedback was necessary and a second round of interviews was conducted with five of the seven participants to discuss their feedback from the transcripts. The two remaining participants were contacted by mail and they felt the interview transcript was accurate and therefore had no further comments or experiences to add. Arranged interviews with selected participants allowed for further reflection and exploration of the transcripts with a goal of reaching the fullest interpretative insight as possible (Van Manen, 1990). The second round of interviews occurred in the participants' offices except one which took place via an audiotaped telephone interview.

### **Data Analysis**

To conduct the initial thematic analysis of the data, the researcher concurrently used the software Ethnograph and Van Manen's selective highlighting approach as outlined by Max Van Manen's (1990) book: Researching Lived Experience: Human Science for an Action Sensitive Pedagogy. Van Manen (1990) believed themes are elements which occur frequently in the research text and should be understood as the structures that make up the experience. Through the direction that these themes provide, a phenomenological researcher can interpret the true meaning of the lived experience with the phenomenon.

Computational Qualitative Data Analysis was utilized. This is simply a computer assisted qualitative data analysis program. Traditionally, qualitative researchers recorded data on pieces of paper. This involved a long, tedious process of coding and organization at the end of the data collection day. In this study the use of the Ethnograph Program



simplified the process of qualitative analysis, and yet still permitted the researcher to remain intimate and familiar with the data. Taft (1993) noted “that because of the ease of coding and recoding, the researcher feels more free to play with the data and experiment with alternate ways of coding, this fosters analytic insight and facilitates data analysis” (p. 381).

The computer facilitated the process of storage, retrieval and provided time for the critical interpretation and analysis. After retrieving various types of qualitative software the Ethnograph was chosen as the software with which to conduct suitable analysis of the study.

To begin the thematic analysis the transcribed interviews were formatted into an Ethnograph file. Each line of the research text was numbered and then the text was read several times to identify words that would be used for the coding. More intensive dwelling on the data occurs when the researcher performs the coding manually (Tesch, 1990). The researcher then identified and decided which words to focus on in the text. The Ethnograph program simply assisted with the tedious but essential task of locating the identified words and phrases throughout the research text and as well, organized the data. This process was completed by listening to the tapes and reading the transcripts several times. The computer does not make conceptual decisions such as identifying words or phrases that are most important to focus on or which analytical step to follow next. The researcher still does the thinking and interprets the data (Tesch, 1990). Only

after repeated readings of the transcripts and listening to the tapes were essential words and phrases identified. As a result of this process the themes began to emerge.

Concurrently, through the process of reading the transcripts several times, the researcher also used Van Manen's selective reading approach. As the researcher read, words and phrases were highlighted that were felt to be essential and would help illuminate the true meaning of the lived experience. As themes began to emerge certain phrases were identified throughout the various research texts that exemplified the meaning of the themes. A comparison of the identified and emerging themes from the Ethnograph and Van Manen's selective highlighting approach illustrated the emergence of common themes.

Five broad themes were identified. At the same time the researcher met with her advisor to review and discuss the emerging themes. Van Manen (1990) recommended this informal and collaborative analysis with advisors and committee members to ensure that the researcher's vision of the inherent meaning of the phenomenon is not obscured by the long and continuous analysis process. At this time the advisor suggested identifying subheadings within each theme. This step helped to more clearly describe the lived experience and helped the researcher in remaining true to the data.

Participants were randomly selected and asked if there was any further information that they felt needed to be noted and at this time they were asked if this was what the experience was really like. Participants had nothing further to add at this time.

A letter asking the participants to review a summary of the themes was sent to each participant to determine whether these themes reflected their true meaning of the lived experience. (see Appendix K). Six of the seven participants responded to the request for their feedback. The remaining participant was contacted through the mail and e-mail but did not respond.

Five of the participants expressed that the themes did represent their experience with living with information technology as a nurse educator. However, one participant identified agreeing with the theme Time: Ally and Rival but was unsure if the subheading Personal Control of Time was reflective of her experience. She stated that “efficiency of time is more reflective of my experience”. At this point it was important as the researcher to be mindful of the unique experiences of participants as all components of the themes may not have completely represented the experience of all participants.

The process of elaboration on these themes continued with writing, relistening to the taped interviews and the rewriting of these themes over and over again until a true understanding of the participants’ perceptions and meaning of the experience of working with information technology evolved. Only through this long process did the essence of what it is like for nurse educators to live with information technology emerge.

### **Credibility and Auditability**

Sandelowski (1986) described credibility as the criterion against which the truth value of qualitative research should be evaluated. “A Qualitative study is credible when it presents such faithful descriptions of interpretations of a human experience that the

people having that experience would immediately recognize it from those descriptions or interpretations as their own” (Sandelowski, 1986, p. 30).

The following measures were adhered to, as to guarantee the credibility of this research study: (1) The research study was closely monitored by two faculty members, both of whom were knowledgeable in various kinds of qualitative research and interested in the use of information technology in education; (2) The interview guiding questions were reviewed and evaluated by three individuals, two with considerable experience in phenomenological research and the third who is an expert in the field of information technology and has experience in qualitative research; (3) Returning to the participants for further collection of data and gathering their input on the true reflection of their experiences and understanding of the themes; (4) Direct and continual contact and correspondence with the advisor and committee members; (5) Providing a summary of the themes to the participants to ensure the true essence of their experience was captured; (6) Following two analysis methods, both Van Manen’s selective research approach and the use of the Ethnograph program ensured that hidden meanings were brought to light; (7) All participants had experience with information technology in their role as nurse educators, being mindful that some participants’ experiences were richer than others; and (8) Ensuring that the researcher’s personal feelings, thoughts, behavior and biases were recorded, described and interpreted in relationship to the participants’ perspective and experience with the phenomenon. In Chapter IV results of this study are presented.

## **Chapter IV**

### **Results**

This chapter is divided into three sections. Section one is a brief description of the participants' characteristics; section two presents the themes with excerpts drawn from the participants' interviews and interpretative material to convey the meaning of living with information technology. Section three provides an elaboration of the interrelationship among the themes and the essence of the lived experience.

#### **Participants' Characteristics**

Seven nurse educators were selected based on meeting the established criteria for this study. The participants shared mutual characteristics and as well as notable variances. Distinctive personalities, range of experience with information technology, variance in years as a nurse educator, distinctive faculty and administrative roles, and participants' communication abilities were some of the diversities that added to the richness of their stories.

All participants were female, which was not surprising since nursing is characteristically viewed as the quintessential female profession and there were no male nurse educators practicing in the population under survey during the time of the study. The participants ranged in age from approximately 30 to 50 years. Just as there were age differences among the participants, there were also variances in the amount and type of experience each participant had with the use of information technology. Most common

among the participants was experience with word processing, e-mail and the use of specific software such as Power Point. Other software programs that included the spread sheet program, statistical packages and the Internet were only used by a few participants. Some had acquired skills associated with information technology through formalized courses and workshops, whereas others recounted stories of learning from fellow colleagues or self- learning that resulted from personal need. Three of the participants had full time teaching responsibilities, two participants had teaching and administrative responsibilities and two were employed in administrative roles. The educational level varied and included a candidate for a masters degree in nursing, a completed master of education and nursing degrees, and doctorate of nursing.

### **Thematic Analysis**

Van Manen (1990) believed that it is important to identify qualities that make a phenomenon what it is. Thematic analysis provided a process of developing a description of the nurse educators' sense of living with information technology in their daily lives. The descriptions encompassed recollected stories from the participants that described the initial contact with information technology and how the experience had continued to the very day of the interview. The stories and anecdotes provided by each participant constituted the data used to further identify themes that were essential components used to detail the phenomenon encountered by each participant.

The study sought to identify essential themes, each to stand alone, yet all linked to create an interweaving of experiences that could not be easily pulled apart. Through this

interrelating process a discovery of the wholeness of the phenomenon emerged to serve as a more complete understanding of the participants' experiences in living with information technology. Using this process, themes were identified from the participants' phenomenological descriptions and interpretations of daily living with information technology. The following five themes were identified from the participants' descriptions, each theme has been classified into subsections to heighten the clarity and true understanding of the themes.

### **Communication: The Open Door to the World**

Communication was a feature that was present in all of the participants' experiences with information technology. Microsoft Encarta' 95 defined communication as "the exchange of information, thoughts and opinions, something that is communicated; a message". Throughout the interviews all participants reported that living with information technology had influenced and facilitated the speed and ease of their communication with faculty and access to information.

### **Accessibility.**

For some participants the accessibility of information through information technology enriched their working lives. Participants expressed excitement and marveled at their ability to freely access information to assist them in their role as educators. One participant stated "It's wonderful to be able to click on from your home or from your office and to do a literature search for topics and titles and journals and stuff like that". Another participant recalled when she put a question out on the Internet "I got some

feedback on the testing of medication, medication pretest with students and actually I got a response from several people and of course as many responses almost there were different versions of it so you got, people from Texas, all over America were responding”. The accessibility to an abundance of information was credited with opening up avenues to knowledge and acquainting the participants with data that would otherwise have not been as easily available. This was referenced as having enriched the nurse educators’ perspective on teaching methodologies and created an open view and an unlimited and nonrestrictive vision of available literature. An example of the value placed on the technology was provided as follows:

It opens up, a lot, I guess it’s the availability of so much information and you usually find, especially with computer searches which is most of the searches that I do, that when you’re accessing on a certain topic that you’ll find extra information that you use in your teaching and that kind of thing.... So for me it broadens my teaching, it opens up new ways of doing things, looks at approaches that people have used and what’s been effective and what’s not been effective and that kind of thing. So, it’s almost non restrictive, it’s much more open then just doing the book search and using your text books and that kind of thing.

Another participant talked about accessing the Internet to add to the content in her classroom:

In other ways I guess for teaching purposes you have a wide access, a quicker search for information and teaching pathology. For example, I can now quickly go



into the Internet and get various sources on various perspectives on many different topics relating to the one area of pathology so it certainly has quickened access to information.

The ease and the speed with which the participants were able to access information technology has facilitated and encouraged a more aggressive use of communication technology in terms of communication with others. The participants' capacity to access information has helped create a broader exposure to varied opinions and increased quantity of information. Information that was newly discovered through the use of information technology has empowered the participants and enhanced the context from which each would make a decision. Through the use of technology, a broader view of available information has enabled the participants to develop and formulate decisions from an open perspective. An example of this phenomena could be seen in the following:

Well, from recall when I was doing my Masters, I mean you go and through the technology; you can get articles come from anywhere, you know; once they're identified on CINAL or MEDLINE or any system, so it brings that component of the world to me. And a lot of people have either their e-mail address written on their articles or they have a telephone number where they can be reached where reprints can be obtained and I mean, I spoke with people in British Columbia when I was doing my Masters course and I would never have done that if it wasn't for technology, you know, or it wouldn't have been as easy to do if I hadn't gotten access to the articles and gotten the information that I needed.

### **Acceleration of information.**

Participants reported fewer time delays through the use of information technology than when trying to contact colleagues by phone. The instantaneous effect and availability achieved through e-mail was seen as a positive development. A characteristic participant statement was as follows:

As people have said to me, it's a lot easier to get me by e-mail then it is to try and telephone me, cause you'll answer your e-mail, and most people were a little bit reluctant until they really got comfortable with it, but then it's really fast. You can get answers very quickly.

Communication is almost instantaneous. Even if they're not at their desk for example you don't have to keep going back to a phone, you know that as soon as they access their computer terminal what you want received from them, they'll have your message and reply to it as soon as they can.

For the participants, every working day included communicating through the use of information technology. One participant noted "Well, a typical day for me number one is, the first thing I do is access information technology as soon as I come in through the door of the office in checking e-mail". For most participants this had become a routine activity in their work day, a habitual activity and a significant aspect of their day. Such routine was conducive in organizing and controlling the work environment. A participant stated:

I use it for e-mail. That's, the use of that has just mushroomed, you know. If I'm away for a couple of days at meetings, I come back much more, my work is via that mode now. I may have fifty e-mail messages and you can spend almost two days when you're back dealing with these communications.

The everyday use of information technology brought forth a general feeling of being more efficient and organized. Another reported benefit was an emerging practice of rating the importance of the received communication. This practice evolved into one where prioritizing messages was used to save precious time. It also assisted the participants in focusing more deliberately on those believed to be the most important messages. It was during such situations that the nurse educators reported a feeling of gaining control in their work environment.

Well, the first thing when I come in, in the morning I'll check my e-mail, and usually now not necessarily, like there's a message there now, if I think it's urgent because you can see the heading, I'll go into it right away, but if I don't think its urgent it can wait.

It's just rapid ability to communicate and then to set priorities. There's e-mail you get that is not a rush but you can set that priority in your head.

The participants' ability to control the process of reading and responding to information or messages resulted in a feeling of increased control over this information. One participant stated "It's very easy to receive and send messages through e-mail. So probably we are getting information that maybe wouldn't have been passed on or you

may have missed". The ease and speed of access to information provided the participants with a sense of being well informed and a feeling of being efficient in their provision of daily work.

I think it's been fabulous for our joint committees because, for example, yesterday I sent an e-mail to a faculty member at another site, we've got a meeting on Friday and there were two or three items that I was hoping she could put on the agenda, so trying to get hold of her office, lots of times people aren't in their office. I just sat down and wrote it up, in a matter of a minute I think I had it sent to her.

However, just as the control over the digestion of communication by some participants was empowering, for others it brought about feelings of frustration and impatience. The anticipation related to sending a message and receiving a quick response but then not always receiving a timely reply, was for some participants frustrating. To other individuals the slow e-mail response rate was accepted as a matter of working style. One participant recounted:

Well, the first thing when I come in the morning, I'll turn on the computer and check my e-mail. And it really, shouldn't say it bothers me, but I can't understand why people who have e-mail don't read it right away. (laughter) But, I'm still, and I guess, I send a lot of e-mail and sometimes people say, oh, I haven't checked my e-mail cause I haven't heard back from them right away, right and I don't understand that because if you got it there and it's important, cause it's such a

fabulous way to communicate, right, but of course it's sometimes, it's because people are out of the office, but I check my e-mail everyday, the first thing when I come in. I have to remember when I'm asking for information from other people that like me, just because they got the message to me quick, doesn't mean I can get the response quick.

The access to and ease of communication with others engendered a respect of the technology's complexity and its overwhelming simplicity. One participant recounted "I can go on the Internet, nurse system and put a question out and get a lot of feedback, so I guess it's not the essence of it, but it's bringing the world to me very readily and very easily, as a nurse educator".

#### **Professional contact to colleagues.**

The ease with which communication provided participants with a broader understanding of the significance of rapid interaction with other members of the nursing profession, was evident. A few simple keystrokes or the click of the mouse allowed them to explore freely a world of wisdom previously inaccessible. The positive feelings were evident as the participants related their enthusiasm when presented with the opportunity to interact with other colleagues across great distances. A typical response of participants was:

It's more ease, you know and I guess with the computer technology even with the faxes and all that, you know, it's been unreal, like you communicate now with

California, anywhere in the world, Australia, you know, just by a touch of certain buttons.

But it's (e-mail) great, especially between, for example the Atlantic Deans and Directors, I have a little mailing list on e-mail for that I can send them all the same message at the same time. I have a master's student list, any committees I'm on I have a list serve for the committees so you can immediately communicate with the group and so those kind of things are great instead of, so there's less paper work, less writing of formal memos and much more communicating. So, in theory, you're more efficient in communications and I think it's true, I think you can do more because of it.

Participants described experiences of communication with others that brought forth the notion of immediacy and a direct link to others and to their work. They associated communication with speed, efficiency, and attentiveness. One participant elaborated on this and recounted how e-mail, one particular task, had provided speed and efficiency to her communication with others. She stated: "as soon as I come to work, I turn my computer on to see if there is anything from yesterday and any e-mail messages immediately communicated to me so you're not using the phone as much, it's much more efficient to just print off your computer".

When referring to e-mail, the participants talked about it as a tool that increased the frequency and the amount of communication. Reportedly the quality of the communicated message was not necessarily enhanced. Mostly the focus was on the

quantity of communication as a valued attribute. One participant stated “and if there are e-mail messages there, automatically it’s responded to whereas before when it was paper you’d get your mail, it would be probably be two hours before you actually got to it”. Some participants reported that information technology did not necessarily enhance task accomplishment. Nevertheless, the speed of the transmission and responses reduced the occurrence of time delays between meetings and appointments. Many of the participants perceived this aspect of relatively uncontrolled communication as very positive. It contributed to their overall feeling of being well informed and it fulfilled their need to communicate with others, if, and when they deemed it was necessary. One participant stated: “E-mail: ask a question, you’ll get back to me with an answer, if you don’t, well, I’ve asked my question, you’ve had the chance, but you haven’t captured me on the phone to talk about other things, so I love that technology”. A perception emerged among the participants of inner satisfaction and well being in the work environment because of the system’s ability to provide them with information and the ability to contact others, regardless of their physical presence. Participants stated:

So instead of going to bulletin boards and reading or people trying to, where we’re all kind of scattered, it’s a big building, we’re all in different buildings really and e-mail is just automatically there for you. So it’s much easier in that way to communicate with the people that you work with and the people within the Health Care Corporation or whatever and to be informed of what’s going on.

Any message that's communicated to others, I want to send, it's done right away. There is no loss of messages, there's no looking or finding some other system, like bulletin boards or telephone messages or whatever. So I think it's probably made it more efficient and certainly more instant. You know, the information is there right away rather than having to look for it or using the telephone messages or finding someone in there office and with our schedule, where we're out of the office a lot, you know, it's just a matter of coming back and picking up anything that happened when you're in clinical or when you're in a lab or classroom.

The participants' sense of well being at work reflected the way they viewed the clarity and completeness of their communicated message to others. Despite the use of voice mail and fax machines, participants preferred the use of e-mail for its efficiency as a communication tool. One participant said that she felt that "faxing took longer, by the time you get your cover sheet done up and you write your explanation on it".

The perceived slowness of other forms of technology encouraged the participants to default to the speedier e-mail. As well, the flexibility that e-mail offered, enabling nurse educators to write the words more clearly to all who were receiving the message was considered important. As one participant stated "you can more clearly communicate, I think because you can more eloquently put your thoughts into words through a written measure rather than rambling as you sometimes do when you speak". This additional benefit of clearly communicating the same message to a larger group proved to provide a feeling of personal effectiveness. The effectiveness experienced with the process of



communication provided an atmosphere of certainty and security which was evident within the participants. The participants believed that through e-mail the message was conveyed as it was intended. As one participant stated "I think I'm able to, communicate things better in terms of, it's quicker in terms of getting correspondence out to people". This sense of security stemmed from the knowledge that important information was clearly received by all. This sense of security is typified in the words of one participant as follows:

For example, the other day there was an e-mail I sent and a faculty member mentioned to me, does it mean this because I wasn't quite sure if it meant this or it meant that, so I just came back on the e-mail and I just sent another e-mail to everyone that said as a point of clarification basically this is what the e-mail meant, so I was more able to clearly identify.

A couple of meetings have been coming up here lately, information I wanted to get out to all the faculty, so rather than putting it on voice mail because through voice mail I have groups, I have ... you know, but here I just, you can write it more clearly then when you're saying it, you can fix up, so that you communicate clearly and then you send it out to everyone, so you know that they got it in a written form if they need it, you communicated the exact same thing to everyone.

Not surprisingly participants reported increased satisfaction in their jobs because they felt well informed. This was evident by all participants as they recounted their experiences with e-mail. However, this emotion extended beyond the simple satisfaction

of successfully completing a work related task. These participants described deeper emotions with words and phrases such as “freer”, “open”, “sharing ideas”, “self growth” and “building relationships”. One participant stated “It’s just when you get on the computer; your world, it opens you up, so it makes you freer to communicate with different people, so it’s not only the technology per se, but what it does to your inner self and I’m finding faculty a lot more open now”. Participants associated using the technology as a means to broaden their access to others, but more importantly it facilitated a sense of freedom to share information among participants and interact with each other. This sharing of information among the participants enhanced the professional contact.

### **Professional growth.**

Just as the participants’ use of technology helped them share information with colleagues, it also brought forth more personal changes within the participants. One participant reported a personal change involving the use of information technology for communication and described how it had stimulated a redirection in her thinking and in her way of doing things. She stated:

As I’ve gone along, first I would write and then I would type it in and organize it that way. Now, I no longer, I find it’s too time consuming and I don’t have a good handle on how I’m communicating my ideas very well in writing, so I automatically use the computer and get a draft and reorganize my ideas so that it’s

presented and that in preparing my lectures and communicating with others and I don't need to write to organize my thoughts anymore.

This type of professional growth was reported by other participants. The participants' perceptions of their personal work life and how it had changed was evident through their descriptions of their experience with information technology. One participant said "It has made work a lot more meaningful, that you can interact with a lot of different people and find things with a lot more ease".

It was apparent that participants felt that the use of this communication tool has had an impact beyond stimulating individual growth and additionally offers an opportunity for fostering community growth among and between nurse educators. One participant recalled "I'm finding, I think, faculty are, checking their e-mail more now as we're getting further along in communicating with each other, we're getting more cognizant of checking it". All participants reported having access to e-mail in their offices. E-mail has been adopted as a routine means of communication increasing the accessibility to one another. Participants reported experiencing an improved means of communication which facilitated exchanging valuable information with their fellow nurse educators. Following is a typical response by the participants.

It certainly has enriched my life, I must say and enriched nursing education. I mean, it will never be the same again, (laugh) right. Like I can talk to the top nurse educators in the world on the Internet you know, that what's so amazing, the

people who write all those wonderful books about nursing, they're there, if you put out a question, they'll answer you.

It facilitates communication, it means communication for me with colleagues across the country, colleagues across the Atlantic Region, colleagues within the school and within the university community, so it is a valuable tool in terms of communication.

Beyond reporting new relationships being formed with national and international colleagues, the participants reported that changes had occurred in the nature of their relationships with faculty from the other collaborative nursing sites. Nurse educators commented on the important benefit of enhancing a sense of community among the collaborative sites and the perception of unity as a faculty. Participants credited the availability of the instantaneous exchange of information, knowledge and opinions among faculty at the three collaborative sites with enhancing the external relationships. Participants reported that faculty members were more recently and more often exposed to greater amounts of information and issues commonly shared by all participants. This was a departure from previous experiences of being exposed chiefly to local and personal issues. According to a participant, prior to the onset of information technology: "we were almost working in isolation". Another participant stated "the sense of isolation is going since we've had more information technology available". Other experiences expressed by participants included:

Oh, it has certainly brought faculty open and sharing a lot more of ideas and the freedom to feel that it's good to share, you know, I've seen that growth, it's wonderful actually and I know with us. I mean it's so much easier to talk to faculty and administration at another site, right. It's a lot more accessible.

I think in the collaborative program because we are distanced from each other and the other two sites don't have message manager, I think it's been really an excellent tool for working in joint partnership with the other consortium members because you can arrange meetings over the e-mail, you can send messages back and forth, you know, I think it is really good that way and if we didn't have it I think it would have made it much more difficult for us to communicate.

### **Building a student community through technology.**

As faculty related their stories of how information technology had contributed to the continuing development of relationships among the three collaborative sites, they also raised concern related to their students' lack of connection to e-mail, believing that e-mail might contribute to enhancing communication. As well, they suggested that exchanges of information and building connections between and among students within the different sites of the program would have merit. Participants described how they believed that using e-mail and the Internet would assist in the development of a community beyond their geographic region. One participant talked about a current e-mail project at her site:

I received an e-mail of inquiry from faculty in British Columbia who wanted just to link up their students in first year with students in first year from programs across the country and so they were looking for volunteer sites, so I said well, we'll give it a shot and they haven't actually connected yet but the idea is that those First Year Students will compare and contrast their program with First Year Students across the country and I think five or six of my students volunteered, now five or six only because I think only five or six knew how to use e-mail... I think it's wonderful to get students communicating with each other particularly our students in Newfoundland, they always feel so isolated, it doesn't matter what school of nursing they go to.

The nurse educators found it difficult to view their experience with information technology without considering it in the context of their professional experience with the student. Participants repeatedly rationalized their selection of particular teaching methods or the "raison d'etre" as related to "for the benefit of the student", or "what it brings to education and how it will help the students". One participant stated "It was a great desire to learn how to use them (information technology) and how to use it to the maximum, to the benefit of the students".

The participants felt that a part of their role as educators was to encourage students to use information technology as a means for communication. In the words of one participant: "I have our students trying to connect with students just on this campus that are international and they're having a heck of a time, because of the time, all students

are so busy, maybe e-mail is a way of my getting them to connect with other people”.

Participants indicated that they were of the view that encouraging students to become exposed to e-mail as a means for communication could broaden their learning and enhance their nursing knowledge.

All participants reported being cognizant of the simplicity, ease, access, the immediacy and the enhanced opportunity to access information technology and the value this provided them in their daily working life. Many participants reported that communication with, and access to, colleagues and information would be limited if technology were not available. They described how information technology had broadened their vision to further open their minds to the vast amounts of information, ideas and knowledge that is available with the click of the mouse. One participant summarized the broad access to information that information technology provided.

It's not easy I guess but its bringing the world to me, the totality of it, it's so reachable. I mean I spoke with people in British Columbia when I was doing my masters course and I would never had done that if it wasn't for technology.

### **Time: Ally and Rival**

All participants identified time as having a profound influence on what they believed they could or could not do in their lives. In describing their experiences with information technology participants made frequent references to time. It was acknowledged as related to an ongoing process, a phenomenon that connected minutes to action. For the participants, time was an ally, one that provided them with unlimited

support, and time was the rival, one that continuously dogged each of them because of its impositions.

### **Efficiency of time.**

Time was perceived in both a positive and negative connotation. Several participants positively described time as “efficiency”, “helpful”, “instant”, “beneficial”, and “valuable”. Participants indicated that they often felt that because of their relationship with information technology, their use of time was now more efficient, more organized and more continuous. As one participant stated “It was proposed that it would cut down on work time, which it did, so I think people, or I did, grasp information technology in that sense, very eager to learn, very eager to get in there and do it. I never had a fear of approaching anything new especially something that can increase efficiency and decrease work time”. Other participants related similar stories of their perceived efficiency of time.

When I started using the word processing and plus I got into a computerized item bank and correcting exams by scanner and items, things that would take us days to do would now be a split, well a minute of a computer and here it was all done for seventy items, one hundred and fifty items, you know, within a matter of minutes.

The participant’s efficient use of time was frequently referenced as they related their stories involving information technology. Participants viewed information technology as a means to saving valuable time, contrasting older methods used for doing their work. They marveled at their new found time for other things because of the entry of information technology into their lives. Some participants reported that among the



biggest benefits associated with the use of information technology was a saving in time.

When sharing an experience, about exam analysis, one participant said:

We used to do exams all manually; so there would be a group of instructors working together and trying to figure out how many students got the specific question wrong and how many got it right and trying to analyze it in that way and very time consuming. It took a lot of time and probably didn't get the information we needed. Then we started sending exams to the computer for an analysis, so all of this information came back instantly.

The capacity for instant feedback in the exam setting might have been the first setting in which the participants came to expect quick results and improved access to information. Typical participants' responses were:

And as far as doing, another way of doing searches on the computer, going through the books and finding all the headings like I used to do, finding the key words and things like that, there was no way I could research a topic the way I do now. You can bring up thousands and thousands sometimes, sometimes too many, on a topic for you to even explore and find different ways of grouping topics that you couldn't do with the manual search. So when I'm planning to teach or research on a topic for any reason, I feel I can in a fairly short amount of time get all the information that's readily available.

For overheads, for example, instead of taking out new ones and starting, just going into your file and updating, adding information, again, you have the ready access of the journals, names and you know, even content of them briefly in your CINAL file, so again, all of that is right at your work station so, again, it can be done without it, but time I think is one of the biggest factors that has been a benefit of the computer because it can all be done by hand just as accurately but certainly not as efficiently.

The use of the technology was seen as a valuable attribute to the participants as it enhanced the utilization of their time. Tasks that might previously have taken several hours were now completed within a short period of time. The participants' perception of time was one of efficiency and increased productivity.

#### **Personal control of time.**

The participants' ability to quickly access information which could help prepare lectures and conduct research eliminated some of their daily pressures. Participants discussed their individual perceptions of work pressures and stress in their work life. They identified information technology as assisting in regulating and organizing the time necessary for them to complete important tasks. The participants became their own timekeepers as they organized and regulated time in their everyday life through information technology. This regulation of time contributed to a decrease in their experienced stress in their role as nurse educators. Participants expressed their personal concept of time.

Oh my, yes, the work is, like we figured we'd have a lot more time, but it seems like there's more demand on you anyway, so thank God for the computers, is all I have to say. I mean when I think of what our secretaries use to do for us, using the typewriter, and now if you want to move things or change things it's done with very little effort.

I'm going to say it's a stress reliever. During a day it's not uncommon to deal with sixty different topics or issues. If you can get one off your plate it really helps. You function. And you have to track things so much. With something like e-mail or computers generally even word processing you can deal with something and temporarily hold it there, or you can immediately communicate with other people that you need to contact without trying to reach them by phone which these days is just about impossible.

The desire to control and regulate their time was identified as being very important to most of the participants. As participants talked about tight schedules and job demands, an overwhelming perception of a need to arrange time became apparent. Many participants felt confined within the rigid framework of their daily schedules, appointments, deadlines and decision making activities and perceived their routine use of information technology as a means to enhance the efficiency with which they could use available time. A few participants expressed:

Any memos I do, I do from that committee or any other work it's always just directly into the computer which is very helpful because I know if I'm under a tight deadline and I need it and I haven't had a chance I can do it maybe the night before or even a couple of hours before, I don't have to rely on a secretary. Now, the secretary may have to take off the copies for me or fix up stuff for me, but I find it's cut down on the pressure for me in terms of being ready for deadline sometimes.

Searches have become part of nursing education with CINAL and that type of thing. It's easier to access as well, accessing the journals so that physically, you don't have to go to another building. So that certainly has cut down on time that I do for research and looking into things.

When you are doing things with a pencil and paper, you're erasing, if you had to write it again for a secretary, you would have to write it so that it was legible for them, but at least when you're doing it on the computer it's so easy when you want to change something around, to cut and paste, to erase, it's time consuming, definitely not as time consuming once you've mastered those few very simple skills really. So, that's another way I find it helps me manage time.

### **Searching for time.**

Just as time was viewed as an ally in helping to successfully meet deadlines, time was also viewed as a rival, when nurse educators were stressed to complete tasks to a

given deadline. Limitations on access to time was ever present in the lives of the nurse educators. The adequate use of time was a particular point of sensitivity when working with information technology. Participants reported being focused to time schedules and time pressures, and perceiving it as needed, limited, and lacking. Different participants expressed similar experiences of restricted time

I guess the problem is we get lost in all of the other issues that we have to deal with and the use of technology takes a fair bit of time in order to sift through to find the right software packages.

I don't think if I didn't have the skills in Word, if I was just learning how to do it now I would never tackle at work without doing a course. Never, because there's not enough time to learn and make mistakes in the run of a day, there's just not. Like the Internet for example, is something that I haven't used a lot, I've used it, but I'm not using it very efficiently right now, but I'm not afraid of it, I know that, you know, when I get the time that I'll sort that out.

The expressed perception of limitations on time and not having enough to complete a day's tasks was evident throughout many stories that the participants recounted. The participants reported constantly battling against this invisible enemy. One participant stated "I know there's a lot of stuff out there, finding the time to get a hold of it to preview it, you know, those kinds of things are always a problem I think for nurse educators". Participants lived within this milieu of time and decisions they made or things

they attempted in their daily activities were governed by the constraints imposed by time.

One participant explained:

I don't use it (Internet) really right now, I've done a little bit on it, but, so that is something I wouldn't mind developing a little bit more knowledge and skill in but right now, the time has been a major factor in terms of being able to have the opportunity to fool around with it and if I did it I'd have to do it at home and doing it at home, usually I'm doing other stuff for work at home so I don't have time to fool around with that.

Another participant expressed a similar view.

I have to know a lot more about it in order to communicate easily and to access everything that is on the Internet and to be able to screen and get what I need, cause when I go into the Internet now, I find a lot of things that's totally irrelevant to what I'm looking for and then you realize that you're losing a lot of time and you kind of give up on it.

Similar stories recounted that searching for needed time led to feelings of frustration. This emotion was often associated with lack of information technology skills which was further compounded by restrictive time schedules that limited the participants ability to exploit information technology to its full capacity. Participants stated:

I found that if the students don't exit properly you can't access the information properly and so when you are in time crunches with courses where you're only there for two hours, you can't keep them longer and you're trying to fix these

glitches by quickly calling Patient Information Systems to allow us back and access the things properly, that kind of stuff just drives you a little bit over the edge at times.

Yeah, that was those big tables, like the joint program evaluation plans, see how that's tabled, it was too complicated for me, now since then I've been doing some minor stuff in tables and I realize now what I was doing wrong but it was really frustrating and I didn't have the time to figure out how to fix it.

The reference to time as described in their stories demonstrated the participant's own understanding of time. Time had become a state of being. Their daily activities depended on their perception of time at any given moment and how they could deal with it. Time was reported as sometimes lacking and choices had to be made of how to best exploit a limited availability of time for advantage. Prioritizing and implementing a plan of action which made the most efficient use of time was a concern. Participants expressed the importance of time:

I don't very often need to send an e-mail to faculty around here so I don't use the program Pegasus, I just use the telephone because I haven't had time to figure that one out yet. The big picture of the technology is not the problem, it's all of this other stuff (glitches in the system) that I find, it's time consuming in order to sort it through.

There was supposed to be a two hour computer lab, but number one, I mean this faculty member just didn't have time, so another faculty member went in and did some stuff on the ethics and the beginning stuff on confidentiality in the classroom. Right now it (Internet) is pretty much unknown you know and I fool around with it to some extent but when you realize it's taking a lot of time, and you've still haven't gotten anywhere, you tend to shy away from it and you know look for some other means.

Another participant referenced her experiences in learning word processing. This participant indicated that if faced with that challenge again, she would still seek to master the associated skills despite the restrictions that it would pose on in her work life time. It was apparent that the participant valued the new skill and would seek it out again regardless of the time it would require to achieve some level of acceptable skill attainment. The participant stated:

When I first started doing papers, I would write them and do some on the computer and write some but after a period of time, it was all, like my thesis, was all done from here (points to head) to the computer, none of it was written. Unless I was out somewhere and I had a few thoughts and I jotted them down, right, but if I had to come now and learn it I don't think the job, there's too much pressure in the job, too many time factors that you could never learn it on the job".



Participants shared thoughts on how the limitation of time sometimes added pressure to their roles as nurse educators in the context of what they perceived they should be doing with, and for their students. The participants explained:

If you're not regularly in a clinical setting where you're using that patient information system it's very easy to lose the skill, although it's getting easier to pick it back up, it's still that process of finding the time to retrain yourself prior to being responsible for training our students, because where as, a few years ago, we were able to depend on in-service personnel, for example the Health Sciences to help us train our students, with the cutbacks and those types of shortages they're no longer doing that. It just makes it a little bit difficult when you have to find the time to refresh yourself.

Oh, yes. I mean our computer lab, students now, we had to limit the amount of time because we only had twelve computers and so we gave them two hour limits to be on the computer. They are used all the time, right, all the time.

**The course of time.**

Clearly and repeatedly time was described as being limited. Participants also defined time as a reference from which they could have described the intrusion into their lives by information technology. The participants' use of information technology was associated with change in their lives. One participant observed how things "changed so quickly over such a short period of time". Participants related time and using information

technology to rationalize the change that they experienced in their lives. Another participant said “Word processing is almost essential now and that you can’t imagine not having access to word processing. Where as years ago, we didn’t and we did exactly the same stuff but certainly word processing is an essential that I can’t imagine preparing a lecture without the ability to word process”. Similar views expressed by other participants are:

So it all takes time but we’ve come along way, when I think ten years ago and this is the truth, 1987 there were only two telephone lines in the school in the corridor, okay, except for the administration offices. No one had a computer, no one had a telephone in their office much less a computer and now I think there’s only two faculty that don’t have a computer, so we’ve come along way. A long way in a short, in a decade, really.

You know it’s hard to think back, like even five years, the way we were doing things and how much time it took and how limited probably our access was at that particular time and to look at all the changes that has become a part of what you do and how differently things are done now and you know, obviously more efficiently.

Another participant reflected upon the emergence of information technology resources and remarked that the quality and quantity of resources available to students had increased. She recalled that her first involvement in nursing education in

Newfoundland, included only a small computer room for designated student use.

Computers were out of date and few students even had computer accounts. Since that time, two computer rooms have materialized and most students come into the program with working level proficiency in word processing and the use of e-mail. Another participant said:

So it's been a lot of change, even in five years, like when I started university I don't think e-mail was even into being, or just starting, no, I don't, it was the Internet and all that, we were just getting into the computerized literature searches and then they had certain ones on line and within a year though, by 1994, I think e-mail was really in, 1993, 1994, so it has really become popular.

A common element emerged in stories provided by the participants. The parameters connected to time existed inside their minds. The way in which time was perceived was affected by many variables at that moment. When the participants had many tasks to complete, their perception of time, at that moment, was that it was fleeting and stress provoking, but it also had a particular reducing quality. Access to information technology was not dissociated from the reducing association to time. When they experienced less pressure at work, time appeared to be slower. Information technology had emerged as a valued component to have in a nurse educators' restricted time frame. However, these changes had occurred quickly. Participants explained the changes they witnessed in information technology in the context of their own perception of time over that continuum. Sometimes time was the ally that supported and comforted and

sometimes time was the rival that competed and cheated. One participant's words illustrated this feeling.

I did start working with the table myself but it was really frustrating, I was losing stuff and it wasn't worth it, so I sort of know my limits and I don't want to be wasting valuable time doing stuff when I know the girls (secretaries) can do it, right. So I try to use it, the word processing, try to use it when it saves me time, basically and it does save me time.

### **Need to Learn: Responsibility and Desire**

Each participant identified the way in which the need to learn influenced their use of information technology in their lives. A need is often described as a desire for something that is necessary in order to survive, or is useful. It is also described as something that is desirable to possess and that will enhance one's life. Words that participants used that described this need to learn are "it's my responsibility", "a personal stake in it", "it's for my work", "using it to the "max" for my students" and "what it can do for me". The need to learn varied among participants, however, a common need prevailed. Many described being motivated to understand and master information technology by a sense of obligation to the student, and a sense of responsibility to keep up to date as a nurse educator. The notion of responsibility and desire to learn that was common to all of the participants consisted of two components. Firstly, there was a responsibility as an educator to maintain quality and excellence in their individual teaching and research. Secondly, there was a desire for self actualization in terms of self

confidence, a sense of self adequacy, and a feeling of achievement. As one participant described “I use the computer, not for the sake of using the computer, but for what it can do for me. I’m not someone who uses it for computer games, like some people just for the enjoyment of using it. I like it for the quality it gives to my work”. Another participant related “The other side of the coin is that in order for me to get comfortable I have to see the relevancy of it, of that particular mode of technology for myself and feel that it is really going to benefit me in the long run and then make the time to get myself trained”.

### **Individual challenge.**

The impetus for the motivation to master information technology that participants believed would be advantageous to them personally and professionally had its introduction occur at different times. The majority of participants described their need to learn as beginning when they pursued advanced personal development goals. A participant shared how she began to and continues to fulfill the need to become comfortable with information technology:

I then realized that I needed my own computer, so I bought a computer for home and I found within the computer, they have this wonderful new system called Windows and at that point I began learning how to use their, like, I don’t know what kind of package it is, it’s the package with the windows that had a write program which was a basic, basic word processing program, so that’s how I began, I taught myself because I had my own computer at home I could teach myself so then I became more comfortable with the click, the mouse, that was my

saving grace and then as the technology improved well I advanced my own software with that same type of technology and became really comfortable with that. When I got the latest Windows package I didn't even, I don't think I opened up the book, I just tried to figure it out myself because the book was never satisfactory to begin with, so fear, initially, new technology, wondering if I am too old to learn it. Do I really have to? Could I keep putting it off? Could I keep using secretaries? And you know you can't live without it. You have to have the ability to use that technology and certainly when you're generating the amount of information we do preparing lecture material, preparing overheads, preparing for presentations, writing papers, it's the only way to survive, you can't do it with pencil and paper anymore, so I've learned to love it.

Participants indicated that they were motivated to learn information technology as a result of their pursuit of a higher educational goal. They reported that although they were not obliged to learn the technology, there were motivating factors at that time. One participant stated "I developed it from my own educational opportunities. And I was, in a sense, not forced but I found I got more comfortable with and more confident in my abilities with using it". Another participant described how her discovery of her need to learn this technology arose from her desire to achieve excellence in her teaching. She stated "I started using it and really using it when I was doing my papers and my thesis. I found that, like it was very important for me to not have errors in my work and to have it

organized well". She continued on to describe her experience when introduced to information technology.

So I started to use it when there was probably a need to do so which helped me, I started typing my overheads, my literature searches became very, very wide when I was doing my research at the university and now of course that carried over into my teaching. As I found as I got more into the greater access and the ease of access, then it became very exciting, and more control I think over what I was doing. I found that getting someone else to do some of the work for me, for example, what I would probably, in the library have the librarian do a wider search or I get someone else to do my typing then I found that, that didn't give me maybe the control that I needed. It wasn't there, I would get back and I wouldn't be happy with it, it wouldn't be the quality that I wanted or I wouldn't have the information that I wanted, so almost as a need I started to take up a lot of these things myself. I struggled through it because I knew at that time it would be worth my while in my teaching and in my research.

Another participant reported being casually motivated to learn information technology when she sought to enhance her own academic prospects to later find that information technology had become part of a natural and continuous learning process.

I think I bought my, well, the first time I ever used a computer, was in 1978 when I was doing a Masters at the university and that's where I first was introduced to them and started using them and then, then I finally bought a little portable in

1984 maybe and you know I go to it, high school night school to take introduction to computer courses because you know what I learned at university was on a main frame but you know in the early 80's we were getting into PC's so it took high school night courses on introduction to computers and things like that and bought books and manuals and got a computer.

Another participant shared the way in which she jumped in with enthusiasm when computers were first introduced into the workplace. She stated "the time was here for them and you kind of jumped in and learned what you could". She recalled: "I was excited. I was also impatient right, cause I wanted to be able to do everything."

Other participants expressed this same level of enthusiasm and desire to learn information technology. As one participant stated "I did personally jump in with great enthusiasm so that I could learn what I could and use it to the benefit of the student". Participants' vision of how they could best exploit technology included professional and personal benefits such as efficiency and organization. These benefits were described as not only enhancing their own educational endeavors, but helping to confront their personal challenges of self adequacy and self competence. There was little indication of an outside force that compelled the participants to learn the technology. Participants freely chose to learn the technology themselves, the overriding motivation to learn was their own personal growth, the consequential benefits flowing to the student. One participant's words exemplified a typical response by the other participants.



I was very eager myself to learn what I could and when they were introduced at the beginning you played with them for hours and hours and figured out how to use them, so there was never a reluctance to use them... It also helped me personally in my papers that I was writing and learning word processing so not only to the benefit of me as a nursing educator who was studying, that they certainly benefited me which was another reason why I was very eager to learn how to use them because I had a personal stake in it as well as a benefit to the student.

Although, some participants experienced initial apprehension and self doubt in dealing with the technology, the overriding obligation and need to learn prevailed. One participant recalled constantly going to others asking “how do you do this”?, “how do you block that”, “how do you get rid of that command”? Participants identified experiencing a range of emotions from fear, anxiety, to enthusiasm and excitement when first encountering information technology. Connected with these initial feelings was the overwhelming feeling of having to learn. As one participant expressed:

I think that (word processing) probably is my first use of the technology and terrified is what I was because at that point when that technology was first introduced and I felt a need to learn how to use it we were dealing with Word Perfect, I think that was widely used and you had to use function keys and you really had to learn I think. I felt I had to learn from somebody who knew in order to use that properly.

Participants reported that they recognized the importance of information access and the association it had to various information technology skills which needed to be acquired. They also recognized that the responsibility lay on their individual shoulders. One participant recalled “you know, when I look back, at when I actually decided this is something I’m going to do myself, I’m not going to get someone else to do it for me and when I made up my mind that was all of my effort into doing what I wanted to do and being able to use it.”

Participants associated their sense of responsibility and their desire to learn information technology as stemming from a need for independent accomplishment. They also indicated that a determination to excel in and to direct their own learning was also a factor. Another participant said “Like, how I use information technology, for example, the word processing, say for example, I don’t think there should be enough time made in my day for me to learn that, I think that’s my own professional responsibility. If I want to do it then I have to take the responsibility for developing those skills myself.” The participants’ feelings of increased independence also directed them towards further study. As one participant expressed “Once you’ve got the basics down then you teach yourself things as you go along the way, that’s just learning and learning a few little tips here, there and everywhere”. Another participant stated:

I think you have to do that yourself and take the topic in the direction that you want, so its probably more of independence as much as possible....Even analyzing data for my research. I did all my own analysis and if I wanted and I

was encouraged at that time to go and pay someone to do my analysis for me, but SPSS had just come out, I was one of the first people to use it, so it took me a long time, so I felt that I could work my way through that if I wanted another test done when I reviewed my analysis it was just a matter of going to the computer and doing it, but if I had hired this person, I did, I interviewed several people in relation to doing my analysis for me that I would need to make an appointment, go back to them, and be sure that they knew what I was doing and communicate it in that sense, while someone else was to understand my way of thinking, but if you have your own thoughts, your own ideas, I was really pleased that I hadn't gone to someone else to do my analysis and the people that I had talked to, I probably spent an hour trying to explain my research project and what I was doing and to find they probably still didn't have insight that I had as to what I was doing, I decided to spend time learning it myself.... You eventually have to get into doing it yourself, it's not something that you can get someone else to do for you.

Even though the participants accepted personal responsibility for learning information technology, it was a goal they needed to achieve in order to promote the feeling of adequacy in their role as a nurse educator. Through self-teaching, participants gradually grew comfortable with the technology; albeit some more quickly than others. One participant shared her feelings when she first began to learn information technology "you're afraid, afraid is not the right word, but you're afraid you're going to do

something wrong, I was afraid I was going to do something wrong with the computer and hurt the computer and hurt the program, but not anymore”. This participant is gradually obtaining a level of comfort with the technology and recognizes the advantages of technology for her. A similar story was told by another participant who explained how she began to learn information technology skills and what meaning it gave to her.

Any thing to learn, something new, very eager to do, when I first came here one of the first things I did in the school was to teach the computer package to the third year students and I think that experience kind of again, not only forced you to learn it in great detail but it gave you a level of comfort so that when I came as a permanent member of staff with nursing education I had that behind me which certainly facilitated my desire to learn more.

### **Self satisfaction.**

Other participants described similar experiences that not only demonstrated their desire to learn, but also identified a continuous process that guided them towards a sense of self accomplishment within the context of acquiring information technology skills. This sense of self-achievement contributed to a feeling of personal control for the participants. One participant said “I can plan better, I can plan better because I know it’s me and the computer. And what I, or rather what the computer can do for me or what I can tell the computer to do and what it can do for me and I don’t have to go to someone else. But for me it’s just, it’s the symbionce with the computer”. The participants’ sense of personal control associated with information technology was associated with

satisfaction, productivity, self accomplishment, and pride. As one participant stated “I steered away from using word processing myself until I found a package; All I had to do was click. Using function keys was something I just never mastered very well, so, there’s no excuse, if I can do it anybody can do it”. For these participants being able to complete work related tasks independently created a sense of personal accomplishment and self satisfaction. The following three participants expressed this common feeling of personal achievement.

A lot of self taught and you know once you’ve done some self teaching you know that you are not afraid of it or any one of that sort of thing. But I also took little courses here and there as well and I’ve been buying computers ever since.

As word processing and that kind of thing, I think it was being dissatisfied with what someone else was doing for me and knowing that I really can do this myself, and the bit of effort I do in the beginning will pay off later on and it did.

Before, when I would have to get things ready and I would have to rely on someone else to put it in a type written form and a good form, I had to meet my own deadline of getting it ready and I had to meet their deadline of how soon I had to have it in and because secretarial support is provided for not just me, but for a number of other people then you couldn’t expect someone would drop whatever they were doing and go to your work right away. So, this way, I’m able to, you’re almost like your own master in a sense that you, when I determine a

deadline, it's a deadline that you know that you have total control over, I guess.

That I don't have to send it somewhere else and wait that when I've got something and if I feel that I can do it myself through the computer and I don't have to wait for someone else.

A recognition that lack of information technology knowledge and skill both encouraged and increased the participants' desire to learn was common. One participant recalled that she had not been comfortable with accessing the Internet, but became involved because of a need to learn. Her involvement with the skill provided her with an increased sense of comfort and confidence with its use. She said "I, however, over the last year I have tried to increase and have increased my skills in quickly accessing what I feel is accurate information on the Internet and now if I'm in the computer lab and a student asks me for help I'm much more willing to quickly you know go to that student's aid and not only help her access but teach her or him how to access it so they have that skill".

### **Continuous learning.**

Participants reported that as information technology became more integrated into the school's environment it became part of their daily work lives. It became one of many skills that they felt compelled to have in order to keep up to date. Participants reported a need to develop skills in using various types of information technology programs. The Internet, Microsoft Excel and the Banner system are among these. One participant stated "I know my job could be a little bit more efficient if I knew how to use the Banner

System which is another package here. I could get in and view my student's files quite quickly, but I have yet to get to a class to be taught how to use it because it always conflicts with my schedule". This participant, like others had access to information technology, but reported that she did not feel she had adequate skills and the knowledge to use information technology to its fullest capability. Several other participants expressed this common opinion of perceived inadequacy with information technology.

We were laughing at a meeting not that long ago, I did some work at home and I had the page number up on top and on bottom and I couldn't get rid of the one on the bottom, I don't know how to get rid of it and this is on the Windows 95 at home, it came up right. Still, I don't know how to get rid of it, so I just use white out now to get rid of it. (Laugh) That's the quickest way.

And that's probably the next thing that I'm learning. I haven't used the Internet a lot probably, it's only been set up on my computer for the last two months, I find it really time consuming to get the information I need. A lot of the information seems to be just kind of things that's not necessary, or I don't know how well based it is, you know, if your looking for information, at least my impression now, my knowledge is pretty limited I think on the Internet.

There are a lot of information technology skills that I still need to learn like Excel Programs, spread sheets, those kinds of things that I haven't used extensively,

how I'm going about trying to learn them is from colleagues who know how to use them and getting their expertise.

Participants equated their experiences with information technology as learning that occurred on a continuous basis. They indicated that there was a constant need to keep up to date. One participant stated "you have to keep up with students, you know, you got to be a quarter of an inch ahead". Another participant stated "there's so many changes it's very difficult to keep up with them all. Whenever you turn around there's another new package coming out or presentation packages". During the interviews, participants frequently used the phrases "keeping up to date" and "keeping my skills up". One participant related how keeping up to date with computers have changed her working environment:

But computers have done a lot for me and for, I know for our site in the past seven, eight years, ten years really, I guess, the big change has been since 1991 when the computer speed and programs became a lot more available, so that's when the changes came. And now it's endless, it's keeping up with all the programs.

As participants described their motivation to acquire more information technology skills, they acknowledged that like their students, they had different learning preferences relative to information technology. One participant indicated that her initial struggles when learning about information technology and how she took advantage of the



experience and expertise of others with information technology to help her develop skills.

She recalled:

So it was a matter, you know it was just lots of times I would call this friend of mine when I was writing papers and she taught me how to cut and paste over the phone and that kind of stuff and a couple of times at work, I'd call down to the secretaries if I was doing stuff and they'd be able to tell me on the phone. Initially it was, they'd have to come to my office, the secretary's office was right next store to mine but over a period of time then it was just over the phone. But I don't do that any more really, not very often, I know there's a lot more things I could do with that but I just work within what I need.

Another participant recalled a similar story of how she learned various aspects of information technology "I guess I could enroll in classes but that's not something that I personally do desire at this time to do when there are experts in the building who may not be experts in information technology but who have developed their own skill, for example in spread sheets, who I access somewhat informally to learn".

Throughout the interviews participants identified various approaches to learning information technology. One participant stated "The couple of days, the two day work shops, I found were very beneficial in teaching me word processing, understanding data bases and, then of course I got into the Internet a bit, but I find the workshops very, very beneficial".

Participants pursued various avenues to learn information technology. However, a common component of each avenue was the significance that the technology had for each, personally and professionally, at particular times in their lives. A participant expressed her view:

I'm very reluctant to learn like that, by trial and error, because I don't want to mess up whatever is on my computer, so I'm a little bit more structured in the way I approach my learning and therefore I need to at least initially, feel that I'm not going to mess up by practicing and if it is a system that I at least have some knowledge about and I can transfer knowledge into a new system well then I'll play around with it... and then if it helps me in my job, if it doesn't seem very useful to me then I chuck the technology out the window.

Other participants' desire to learn information technology motivated them to take computer courses. Others were self taught or learned from their colleagues. For all participants it seemed learning information technology had become a part of their regular work and not considered an interruption. The participants related that learning information technology was interesting and sometimes challenging and it was important to continually develop knowledge on a daily basis. One participant recalled:

I did send an e-mail a couple of weeks ago to two colleagues on the joint program evaluation committee and I was able to send it to two of them at the same time rather than writing two e-mails, so I did learn that one, yea and I think what I learned it from is I looked at someone else who had sent me an e-mail that I

printed off and I looked, saw what they did, I think there's a comma in between the two names, I think that's what it was and but I don't think I have all the e-mail skills mastered.

### **Daily learning.**

Information Technology, as participants reported, became a constant presence. Because of its intrusion into their personal and working lives, its omnipresence became increasingly difficult to ignore. Information technology was everywhere and the decision to become proficient in its use was more related to its presence in their lives, than to altruistic motivations. One participant reported about her increased use of telephone conference calls to meeting. She reported that "the technology just becomes part of you and you're not hampered in discussions or thinking because you forget that the telephone is there".

On one hand participants believed that they could perform their role adequately without using information technology. However, the known advantages of technology and its omnipresence stimulated a desire to learn as much as possible. This was translated into a need to learn as quickly and as much as possible. Participants' inherent desire to learn also stemmed from a self evaluation of their knowledge and skills with information technology. When identifying the areas in which they use information technology participants were compelled to stress exactly what they were capable of doing with information technology at this time in their lives. One participant stated:

My feelings about it (information technology) is its something that is not only in your work life, it permeates every kind of aspect of computer technology now, if you go down to anywhere, you know, checking in a store, you know how to zip code something and see if it's the price, I mean that's all now to the public, so I think if you fall behind in information technology it's not only your work life but your whole social kind of being, you know, information technology permeates the whole kind of aspect, so feeling wise I guess it's something that it's inherent that you want to keep those skills and you want to be as advanced in information technology as you can. How you can go about it or, how I go about it, I should say is that word processing, e-mail, CINAL those are kinds of skills that if there is such a thing as perfecting them you know they are perfected to the point that I don't need to learn anymore of the essentials to benefit at work, like word processing is used to the maximum, e-mail, CINAL searches any CD ROMS that kind of way are certainly all used to the maximum that I think that I can use them.

Another participant talked about being exposed to information technology through a course, being exposed to information technology out in public and how these experiences had "brought the spark on". Participants' continuous exposure to information technology motivated and encouraged faculty to learn more and to interact more with the same technology. Participants also reported a belief that the exposure to information technology provided them with an opportunity to learn the programs using a continuous learning process. This resulted in gaining confidence in their use of information

technology. The need to learn this technology became a motivator in their lives. The following words of 2 participants are common experiences shared by all the participants.

I guess I was doing a university course in the late 80's about computers and writing a short program like we, it was just a basic introductory course but writing a short program and getting it to work, is just like, it's just like the world lit up, you know, this has great potential, it was unreal and from then on my life was never the same....

The Microsoft Excel program, for example, I wasn't using it because I was never exposed to it and I didn't have the level of comfort to fool around with it when I had student's marks actually input in, so I didn't work with it so I could learn it, but recently I just purchased a home computer and I have Microsoft Excel on that, so over the last week just for example, I've put in artificial numbers, so I can play with it and become comfortable with it and now it's a program that I have confidence in.

### **Recognition of the need to learn.**

Although participants identified a motivation to learn the technology, hands on experience in working with information technology sometimes brought about feelings of self doubt and frustration. Such experiences sparked an acknowledgment of their lack of information technology knowledge and skills. One participant stated "I don't know enough about the technology to have students screen it (Internet) properly, so from my

perspective I know I am probably at maybe just a little bit higher than a beginner's level in terms of the use of all of those different aspects of the technology and to comfortably encourage students to use it, I sometimes find a little difficult because I can't give them the guidelines I think they need". Another participant recalled how frustrated she became when she lost valuable working time because of her lack of technology skills.

I was working late here at it and I got home and it was a Friday night too, I was so frustrated because I wanted to get this done and I started at home again that night and I can't remember if, what I brought home from here was lost or what I worked at, at home when I brought it back here was lost and it was all lost and that was really, really frustrating because I had some stuff because it went from here (mind) from here to there (computer), right, so that was really frustrating, so like I said, I came to terms with that, I didn't have enough information technology skills to do that so I had to let someone else who was more skilled do it.

Another participant told a similar story of frustration:

I won a computer notepad, it's just a little tiny thing that you can take with you and write, hand write and it converts into print, I never knew there were such wonderful pieces of equipment that existed. Came in here, played around with it, I had the grandest time trying to figure it out, read the whole manual first, then played with it, then brought it into work and fooled the whole damn thing up because everybody here wanted to play with it so I had sort of programmed that little computer to my handwriting and it worked perfectly, brought it in here,

everybody played with it and it couldn't recognize anybody's handwriting and I haven't gotten it fixed yet and so you wind up spending a lot of time printing things so it will recognize the printed form so that it can convert it, drove me insane, so here's this little thing that I thought would be very helpful, ... so it's sitting there in the drawer.

Another participant shared a personal story concerning her bewilderment about accessing the Internet. This participant exhibited an underlying desire to learn more and demonstrated the value of learning this aspect of technology. As well, the observation raised a deeper question of how a nurse educator might go about doing this. One participants' response was:

I had my son in here (her office) this past week, he knew how to access it (Web) far better than I, which is why I don't have it at home because there's too much out there and I was surprised to see how many entries there were for something so small. He was looking for information about Cabot. Thousands and thousands of entries on the web, you could click on to but how do you even begin to know where's a good place to start, I'm at a loss, I'm raising my own issues here for you aren't I?

The sense of uncertainty associated with the technology was shared by other participants. Nevertheless, the comments of most participants pointed to the nurse educators understanding of the need to learn. The participants recognized and reported a lack of information technology skills. They also identified the level of knowledge that

was needed to broaden their use of information technology. The participants' learning needs evolved from their acknowledgment of requiring more knowledge to effectively use technology in order to enhance the learning environment of the classroom. A participant stated:

But a faculty member herself told me she was at a conference, the Canadian Cardiovascular Nurses Conference, I think, she said there was awful lot there, practically, a whole day on information technology and ethical considerations and confidentiality those are the types of issues we really need to see and get some resources there so maybe it's not all going to be lab stuff, maybe it should be theoretical. So, that's my ignorance, some of it's my ignorance, I don't know an awful lot but it is very interesting .

The participants' experience with information technology brought about a continuous recognition of the need to learn, which was not limited to themselves. The desire included a need to impress to students the importance of learning information technology. As the participants shared their experiences about information technology, they expressed the opinion that students needed to take advantage of the available technology. Throughout the interviews some participants spoke of working with students with a sense of responsibility to share views regarding the need to learn information technology. One participant expressed:

I told them really early on how important it is for them that they would soon learn in nursing how important it is for them to learn how to use computers in a variety



of ways and that they would soon learn in nursing how important that is particularly working on a unit and for patient information, but they also needed to acquire the skill of word processing and it would make their lives a lot easier if they learned how to draft and redraft and edit papers rather than hand write and redraft, because you don't get a satisfactory result. So, having said that I also let them know that for me one of their assignments had to be submitted using a word processing computer software package, not a typewriter that was a word processor, but a computer, and this student just came up to me at the end of class when she heard that, cause I let them know that very, probably the first day of class. There's no way. I don't even know how to turn it on. I said, that's why we have a lab so that you'll learn how to turn it on and that's why you have this assignment so that I force you to learn how to use that. Well, she was just in a state and unfortunately for this student, if I seem to recall it was her, but when they went down and they put their paper on computer and then they went to save it to a disk, you don't know how many lost their paper in that transition because I guess they had never saved to a disk before and lost the whole paper...I think it is important for us to make sure we do something about forcing that behavior a little bit.

In describing their experiences with information technology participants concluded that the use of information technology had made their working experience more productive, it had increased their access to vast amounts of information and it had

increased the quality of their work. Because of this experience, participants expressed their beliefs that students need to also learn information technology. Participants expressed:

Those things you learn in Nursing Education about how to find out information, well, you can do it faster using the computer. You can do data base searches and you can do. I mean I do all that on this too, again, it helps you to be more productive, it helps me find things faster, so it's a, these days and increasingly it's an important tool for students to learn how to use.

Last year I did new lectures on pathology of the eye and the ear and I had a fair amount of time to prepare for it, so after your research book wise was done and journal wise I did go in and search many web sites with regard to pathology of the eye and the ear, some of which were credible, some of which more opinion than fact but I certainly took in a lot of information you know from those particular world web sites and I certainly encourage the students to use them as well.

### **Technology: An Everyday Existence**

All participants identified information technology as being a ubiquitous presence in their lives. They described it as permeating their everyday routines and an integral part of their workday routines. Participants used information technology in a variety of ways in their day to day work routines, and all spoke of how information technology made sense in their lives. One participant said "I can't foresee spending a day not on the

computer for one thing or another and socially it's becoming that way as well, that many things whether it's entertainment, whether it's accessing information that is not work related but you know, in one or another the computer and information technology has impacted on that, so it's becoming a way of life".

Participants described how it had facilitated everyday organization, a connection to information, access to others and was perceived as being beneficial and helpful in their everyday lives. Another participant remarked "it's become integrated as part of what I do, I can't imagine right now teaching without information technology". Another participant expressed a similar opinion.

Information technology is helpful in decision making as well. You know, the fact that I can get information quickly, that I can have an SPSS file done on whether it's registrations or whether it's enrollments or whether it's marks from a course it helps you make decisions instead of sitting down trying to do all this stuff manually. Then came the drill and practice exercises, like with intravenous medications, or medication calculations, as part of my responsibility in nursing education, I was responsible for medication education, I was responsible for medication pre-test and calculation tests, so, having the computer helped, computer simulation, the drill and practice was really important. It was really helpful.

One participant related the way in which she conducted "computer searches" as a routine part of her day. She stated "so as far as accessing information, that's probably the

most area that I seem to be doing every day and that I find to be probably the most helpful”.

Some participants noted that easy access to and their interest in the vast amounts of information often caused the time within a day to escape unnoticed. A common air of enthusiasm for the daily access to information and people was noted by all participants.

A typical response was:

I know how beneficial it is to get on the computer and you can be lost for hours and looking and getting excited about the information that you find so easily. It's a very, I find it's very beneficial.

The everyday presence of information technology was seen as an essential for the completion of daily tasks by the participants. Other participants stated:

So I use word processing a lot, e-mail a lot, I do presentations, scholarly presentations, so I use a program for slide shows and that sort of thing....So, it's just a daily part of my working life.

Word processing is used constantly. Especially now, we're in a new program and things that we are teaching, you're keeping up week to week as opposed to you know month to month, that you're constantly in the word processing whether it's, whatever program you're using, but producing things that are used immediately for class whether that's overheads, whether it's handouts that there's no longer paper and pen, you know, if you can find a piece of paper in your office you're lucky to actually write on which is a drastic change that you know you're

constantly in there, programs, so that you're word processing or you're making posters or overheads through the computer for your class time.

I'll check my e-mail and then I'll automatically turn on the word program so it's there for use. I use it everyday. Frequently I will have the disks from home because I do take it home a lot and do stuff at home, so I'm going back and forth.

Participants remarked on the pace and the ease at which they could do things during each and every day. One participant stated "It's there, you know all you got to do is turn on the computer and learn how to do the programs and access the programs and the information is readily available to you". The presence of a computer in every participant's office made it easier for each of them to access the various programs. In the words of one participant:

So being able to present information to students a lot easier than when we first started, ten, fifteen years ago with the old movies, and, I can't even remember you know, trainex systems that we'd have to get information to students on, I mean, computers now, is a lot faster and the CD ROM, it's amazing what you can learn.

Participants associated information technology with perceptions of growing comfort and familiarity. Some, indicated that the initial excitement and eagerness towards information technology had been replaced with an everyday sense of confidence and routine. Participants stated:

Well, they've, the eagerness and enthusiasm for things like word processing has gone because now it's a basic skill. It's something that, it would be a level of discomfort if they were gone as opposed to eagerness that they're here because it's such a daily part of your work life.

It's a part of my everyday work, just interwoven with everything that I do, from getting information to access in the classroom, so it's just kind of interwoven with what I do and it helps me do my work.

Another participant described her constant use of information technology in her life and the natural tendency she felt was the motivation behind that use.

You know, if you define it as programs and computers, what I use in my work, I use constantly. I have a portable, I have a desk top at home. I just, I work all the time with it but in part it's because I'm a typist, you know, I've typed since I'm thirteen years old and its faster I never write anything out, I type it and so I'm always on the computer.

Participants described the ways that information technology had infiltrated their world and had facilitated a deeper understanding in their work environment. It had permeated the activities of their everyday existence. Information technology had become a natural and unremarkable reality in their working lives. Many of the participants described how information technology had become embedded in their everyday life and

sometimes its existence was taken for granted and nearly invisible, yet still, essential to their lives. A participant stated:

I think people use computers differently, some people actual enjoy working with technology but I think overall for me it's what it helps me do. And a lot of it, like I said, becomes a part of your work so you don't really think of it, you don't think of the new way, you know, that a few years ago we did this by hand, it becomes expected, you now, you expect, when we send our exams to the computers, and get back the analysis, you know, you never think anymore, okay, a few years ago we did this by hand, it took us days and now it's all in front of me and I have the information to give to students and how I can help them and things like that, so it becomes interwoven with your work and like any change when you integrate it, it's part of you and a part of your work and you know in a positive way, you don't really think about it anymore.

Based on these interviews it is clear that information technology had become part of the participants' lives and constituted a natural routine as ordinary as brushing one's teeth after a meal. One participant described her definition of education and how information technology had provided for and fulfilled for her the true meaning of education. The access to an abundance of information due to the use of information technology everyday had fulfilled what education was all about for her. Because of the comfort level she had achieved with information technology she identified a desire to

give up work when she didn't have access to information technology in her daily life.

She recalled:

So I think the meaning (information technology) is that it's just kind of broadened everything for me and that it has become integrated, something that I don't think about anymore until the system is down and I realize that I might as well give up for the day, you know and start tomorrow, so it's something that I don't really think about anymore, it's just there and I use it and it's part of everything I do.

### **Cost: Necessity and Choice**

Throughout the interviews, several of the participants chose to comment on what they perceived as the large financial cost of information technology; both the hardware and software, the cost of establishing telephone lines for the system and the expense of building computer labs. As the participants reflected on the costs, they exposed their underlying understanding of the necessity of this cost to benefit nursing education. A participant stated:

You don't have the system right in your office to practice which would be wonderful, but I know it's a very expensive system to hook up, I can't give you the exact cost, but I remember when we hooked up our one lab downstairs on the second floor, I was surprised at the cost. I'm talking thousands of dollars, not just you know, a couple of hundred dollar hook up and it would seem that, that would be an impossible thing to hook up to individual faculty offices so that you can practice and train on your own.



**Controlling factor.**

The costs of information technology was a major consideration for these participants. Several participants saw information technology as costly, yet, as still a justifiable benefit to students. When describing information technology many associated the benefits of information technology with the cost of that technology. Participants found it difficult to think about the benefits without thinking about the cost of those benefits. One participant expressed that she believed computers were costly, but she also thought it was important to have them for everybody, and it was important to keep up with the latest technology. She stated “because computers were costly, they’re still costly and trying to get them for everybody and keeping everybody with the latest is, you really got to look at your budgets”.

Others shared similar points of view and all suggested that they recognized the need for information technology for their students and for their faculty however, this came with a large price tag. Some participants indicated it was difficult to select and choose which computer packages and hardware are best for the student’s learning without considering the controlling factor, the cost. One participant commented:

Well the cost of getting the hardware is one thing but then the cost of certain software in Nurse Education, in Nursing Education is very expensive, like one CD ROM is about three hundred dollars and if you’re going to use that in a lab and have ten or twelve computers and everybody using it, you’ll spend three thousand dollars and that’s only because the company will give you your second and third

and whatever one for fifty dollars each, so, you really have to look at the cost and look at the benefits and consider is it beneficial to have this as a full lab or as a supplemental...

For these participants, it seemed that choices had to be made between the advantages that information technology brought to nursing education and the actual cost of the technology. Participants expressed discomfort with the discord between what they believed was the best for the students' learning and the cost of the benefit. Participants said that it was difficult to ignore the cost because of the tight budgets and because of their uncertainty about the benefit of the technology for everyone. Participants questioned the advantage of spending money when, because of different learning styles, all students may not benefit. One participant expressed a similar sentiment, she felt that learning came at a cost and their education budgets often controlled the choices that were made. Another participant related a similar story of caution:

We have to keep up with technologies, help students find the ones that are good for them and not get totally blinded, you know, I see a lot of jumping on things like computer assisted instruction or I've used it as a supplement in courses and I love it but I don't think it's for everybody and again some of that stuff is just a matter, it's being read off a screen instead of being read in a book, well, I don't think there's a big difference. And you can end up paying big bucks and not getting the value for the bucks and education money is tight.

This cautionary note was shared by several of the participants who suggested that nurse educators need to take time and consider whether this is truly one of nursing education's most important needs at this time. Although, many descriptions given by the participants revealed their positive feelings towards using information technology, because of the cost, these beliefs were accompanied by a guarded enthusiasm for the purchasing of technology. This reservation of what is the best thing to do at the least cost was shared by others. One participant said that it was important for nurse educators to question curricula and to select the best ways to integrate new developments into the curriculum without occurring great cost. This emphasis of cost was shared by many participants. Some identified costs that included orientation of students to computers, the expense of a computer technician and the expenditure for support staff to help maintain the hardware and software. One participant said "It's super to have (computer) believe me, but then you got to face realities of what you can do with what money you have and how best to use your money".

Many of the participants expressed this overriding awareness of the cost, of the budget and of money. As one participant stated "It takes money to buy software and we're all in a crunch for money". Participants felt it had an influencing power over the choices that were made. The following was a typical response:

The other aspect of this I think is money, thinking about what kind of resources we may need for programs. How to secure those resources once you do have

something, equipment how do you keep it up to date. It's a never ending, I was going to say black hole. (laugh)

### **Relationships Among Thematic Statements**

Each theme represented some portion of the nurse educators' experience of living with information technology. Each theme is essential to the phenomenon, yet the themes themselves are less complete if they are not viewed as being interrelated. These themes must be considered together rather than as separate entities. Ideally they will be perceived in the context of an interweave of themes that encapsulates the nurse educators' experience in living with information technology.

The motivation to learn was a prominent theme in the lives of the participants. This motivation was present from the time that the participants first encountered the phenomenon. This theme manifested itself through the participants' inherent desire to become more familiar with and feel comfortable with information technology.

The participants felt that they were personally responsible for insuring that their proficiency with information technology was sufficient to facilitate excellence in their teaching. Acquiring information technology skills promoted feelings of control over their work environment which, in turn, positively influenced the levels of personal satisfaction among the participants. But, at the same time, some of the participants reported that what they perceived as inferior information technology knowledge and skills deterred them from effectively exploiting technology such as the Excel Program, the Banner system and the Internet to assist them in their work environment. The need to learn was a constant

presence in their lives and it became further integrated in their lives through self-teaching, exposure to experts, learning on the job and taking courses.

Time, identified alternatively as an ally and a rival was inextricably bound with the constant presence of the need to learn. Time was described as a friend that enhanced the lives of the participants. Time was also depicted as the enemy that continually dogged them in their lives. Like the need to learn, time was something the participants continuously desired to have more of. Accordingly, many different avenues were followed in an attempt to save time in their lives. Methods that assisted them in saving time were e-mail, word processing, Power Point Programs, exam scanners, CINAL, MEDLINE and the Internet. These methods facilitated an efficient use of time and assisted in speeding up various tasks within their work day. Just as the participants' increased information technology knowledge helped them complete tasks more efficiently, their knowledge of information technology aided in saving time.

The perceived lack of time on the part of the participants was often identified as being instrumental in preventing them from fulfilling their desire to learn more. The participants' perception of limited time in their work environment sometimes caused them to postpone the things they desired to learn. Like the motivation to learn technology, time was a valued necessity and was something continuously sought by the participants to enhance their working lives.

Another theme throughout the interviews was the participants' concern about the expense of information technology in their lives. The cost was described as an

expenditure that some participants found difficult to balance in today's tight economic times. The cost of information technology was approached with a somewhat cautionary note and concern by the participants, yet, also seen as something that was a benefit and even a necessity in the long run. As one participant stated "there is a cost to learning".

Like the need to learn, and time, the cost of the technology was sometimes a struggle for the participants. As the participants often found themselves lacking knowledge and looking for time, the funds needed to buy this technology was often limited. The cost was as much a part of their lives as the need to learn and time. It was a factor that created a conflict within the participants causing them to ponder the technology's value. Participants were able to justify, or rationalize the cost of the technology only when they considered it in the context of its benefit to themselves and their students. Similarly, participants sought funding for the acquisition of information technology programs when they saw it as a means to helping them in their daily lives. Many referred to the expense as a requirement in their lives that ensured that the continuation of their motivation to learn. Accordingly, cost was a factor that determined the availability and their access to the technology. Like cost, the participants' desire to learn and their knowledge level determined their use of and access to information technology. The access to electronic mail resulted in increased frequencies of communications with others. The access to information from others, fewer face to face meetings, lower long distance phone rates and the decreasing necessity to travel to meetings helped offset costs.

As the need to learn opened up a world of knowledge and information to the participants, communication opened the door to the world. Some of the participants described communication as bringing to them a world of ideas, opinions, thoughts and information. As they struggled to learn more they opened more doors to a world where communication would lead them to more knowledge. Having the easy access to communication in their lives provided the participants with vast amounts of information that allowed them to learn more and be better informed. The use of the technology helped the participants save precious time when communicating with others. The access to information and to their colleagues assisted the participants to successfully fulfill the need to learn in their lives. This communication with others was associated with attaining information quickly which enhanced the organization and efficiency of work related tasks. It brought quality to their work, and most importantly it facilitated time management in their lives.

Information technology was ubiquitous in the participants' personal and professional lives. It was almost impossible for the participants to go through a day without encountering some aspect of information technology. The everyday existence included word processing for classroom presentation, e-mail for communication and CINAL or MEDLINE for research. For most information technology was acceptable in their professional lives. The everyday existence of information technology enhanced the participants' desire to learn the technology, a need to communicate through the technology and encouraged time management in their lives. For participants the presence

of information technology made it difficult to function efficiently without having the desire and responsibility to effectively utilize this technology in their lives.

Living with the everyday existence of information technology that permeated their lives inspired and influenced the participants to acquire knowledge about the technology and to communicate more freely with others. This technological knowledge allowed the participants quick access to unlimited information, the ability to communicate without boundaries, and within an unlimited time frame.

### **The Essence**

The essence of what it is like for nurse educators to live with information technology can best be captured and articulated as one of reacting and adjusting to the entry of information technology into their lives - followed by embracing it for its promises. The learning curve connecting information technology and the degree of adoption of information technology was exemplified in contrast at one end by those who cope with and work with information technology, and at the other end by those who articulate having embraced it. All of the participants were located on the curve, none having rejected the advances outright. However, none had progressed to a level of proficiency that to be effectively exploiting the technological tools which, at the time of the interviews, prevailed in their work environment. Given the rapid expansion of technology this was seen as a problem for the profession.

Even those participants who professed being smitten by the information technology “bug”, or being “on-line”, were in reality only able to identify with those



tasks which related to delegation of information. Their skills were essentially more clerical and communication functions. Moreover, even the most enthusiastic proponents of information technology only described their usage of information technology as replacing tasks which they had previously performed manually or with the use of pen and paper, telephone, photocopies or fax. A clear pattern that emerged from discussions with the participants was that none were exploiting information technology at a level that approached its capacity. Participants articulated a thorough knowledge of the potential of information technology and provided a healthy endorsement of the way in which the exploitation of that capacity could enhance their classroom experience. A typical statement, “it’s so broad that there are things that we haven’t even seen yet, that could impact on nursing education, perhaps cost wise, perhaps access wise, we don’t use them but may, some day become a critical component in nursing education”. Nevertheless, none of the respondents reported exploring any of the “new worlds” which they understood information technology to promise.

It was also clear that participants did not view information technology as “window dressing”. At least among those who professed to be “on-line”, the presence and use of information technology was reported as being a serious undertaking and a valuable justifiable tool in their lives.

As well, the presence and use of information technology tools in the participants’ lives clearly helped shape and influence the course of the working environment for nurse educators. Their thoughts, skills, views of students and opinions in their relationship to

change and to each other were referenced in the context of technology. As information technology permeates their lives, the themes: motivation to learn, the element of time, access to communication, everyday existence and the overall cost of the technology, illustrated the participants' experiences in terms of the impact the technology had in their lives.

The participants' discovery of, or awakening to, information technology in their lives occurred at different stages. Some identified this discovery as occurring at the time of their personal educational pursuits, whereas others indicated it happened in their work environment. All participants reported on how they were initially exposed to information technology in their lives and how they had adapted to the evolution of this dynamic technology. The cornerstone of the shared experiences was a positive reaction to the existence of information technology presently in their lives. However, participants demonstrated a vision beyond the reality of what prevailed in their environment. For example, one participant expressed a clear recognition and understanding of the potential of information technology for her, but paradoxically did not venture beyond the basic function of word processing:

I don't think I use it to the extent that I probably could in my work, from listening to other people and you know how well and advantages that they have, I have to know a lot more about it in order to communicate and to access everything that's on the Internet and be able to screen and get what I need.

Other such stories of verbal support came from the participants as they recounted their experiences with information technology. The ability to communicate with other colleagues and the instantaneous access to information had seemingly revolutionized the way nurse educators located and transferred information. One participant reported “Now that we are in a collaborative program and through the use of e-mail, faculty now can communicate with course leaders, one of the means, now we are just getting into, but they can communicate a lot faster and easier”.

Possessing the knowledge and ability to e-mail others enabled the participants to be consistently well informed, hence assisting and speeding up decision making. The participants’ sense of being connected to others beyond geographic boundaries brought about a satisfaction associated with having a link to the outside world. However, at times this connection and ability to use the technology was seen as limiting. Frustration levels rose when accessing the Internet for information became a chore. Not knowing how to refine their research or how to use the technology efficiently led to participants experiencing frustration and lack of confidence when using the tools. The inability on the part of some of the participants to use the technology to its fullest capacity appeared to have had a negative effect upon their experience with IT. It appeared to limit access to particular types of information and resources. One participant’s story elaborates on this:

I’m not sure I know how to do that well enough now to even advise students properly. It’s wonderful to be able to click on from home or click on from your office and to do a literature search for topics and titles and journals and stuff like

that, but then when you go out into that wider expanse of information, you wonder how good some of it is because people throw stuff in the Internet and you know, has it been reviewed, is it good quality, you know there are thousand of entries but you how do you even get the time to go through them to see if something is worthwhile, so there's a little bit of that too, so as wonderful as it is, it can be overwhelming.

The participants acknowledged that they possessed limited knowledge and skill associated with particular aspects of information technology. This resulted in coping responses which were manifested by the participants in various ways. Some, when recognizing their lack of skill and proficiency simply gave up and passed their work to someone who they perceived as having superior skills. Others, adopted a more direct approach such as reading manuals, purchasing a computer for home and taking computer courses. One participant recounted "I haven't used a whole lot like the Internet and world wide webs and spreadsheets. That eagerness that I had with regard to the things that I consider now to be basic, is still there and any free time that I do have I certainly do try to perfect, not perfect, learn".

Participants were cognizant of the quality of programs associated with information technology and also its promise as a part of their future experience in education: "I'm sure there will be new things with information technology, it's just made so rapidly, as soon as you become comfortable with one thing there's something else to learn". Participants identified information technology as a means to saving time in their

lives by increasing the speed of access to information and communication with others, and in assisting in the organization and control of the quality of their work. The recognition of this worth was the impetus for some participants to seek more knowledge about information technology tools. One participant reported “I have to first see the relevancy of it, of that particular mode of technology for myself and feel that it really is going to benefit me in the long run”. Others, despite this cognitive awareness, described feelings that time limited them from accepting and adapting to more sophisticated technological levels technology. Participants’ motivation and willingness to learn information technology dominated many stories. One participant stated “the time was here”.

Technology affected every aspect of their lives and initiated a change in how participants lived their lives. The prevalence of technology in their lives encouraged participants to seek a means to meet the current and future demands of information technology in nursing education. This responsibility and the desire to learn emerged from their seeking personal quality and excellence in their work. Keeping up to date with the technology was seen as a means of coping with the existence and effect of technology in nursing education. The recognition of the impending ubiquitous presence of information technology was the impetus for the requirement to cope with the technology. They felt it was something they could not ignore, ignoring its existence would be harmful to their working environment and to their personal sense of competence. Coping with the technology resulted in the participants’ gradual development of knowledge and skill,

from their personal pursuit of educational opportunities to the day to day requirements of their working environment.

Maintenance of information technology proficiency was not identified by any of the participants as being easy. Many participants talked about their busy schedules and time pressures in their work environments. Often it seemed impossible to cope, frustration was a common expressed emotion that emerged. Many participants reported that there was a distinction between costs that were worthwhile and important to maintain and those that seemed unimportant and could be ignored. Participants favored to work with, and adapted to, information technology that was in the context of their environment. One participant reported “A big part is finding information for use, which comes down to literature searches and that kind of thing as a basis for my teaching. Preparation for my classes, overheads, some graphics depending on what I am doing, so I use word processing a lot”. Knowing the existence of other types of information technology did not drive the participants towards searching for more technology. One participant reported:

I haven't done a lot with computer assisted instruction, I've done some I don't really, some of the hardware that we need, or the software, the programs that we need are not readily available at this time, so I'm not able to use a lot of these in the classroom.

The participants' reactive approach to dealing with information technology included the interaction of many conditions in their environments. As well, the individual characteristics of each participant influenced how each reacted to information

technology. Although there was no clearly defined external stimulus advocating or pushing for the adaptation of information technology, the prevalence of the technology generally was viewed as a catalyst for coping with the change in their lives.

### **Summary**

The findings indicated that nurse educators had a variety of experiences with information technology in their lives, yet, common essential themes emerged from their descriptions of these experiences. All participants related stories of information technology that revealed their individual means of coping and adjusting to information technology in their lives. The participants coped with, or adjusted to information technology in different ways, yet the end results were common to all. They all report having successfully integrating information technology into their working lives. This inclusion brought about a positive reaction to the presence of technology.

The participants experiences revealed five common themes: (1) communication: the open door to the world; (2) time: ally and rival; (3) need to learn: responsibility and desire; (4) technology: everyday existence; and (5) cost: necessity and choice.

The following chapter presents the discussion of the study's results and its relationship with previous research.

## **Chapter V**

### **Discussion**

The purpose for this phenomenological study was to identify through description and interpretation by nurse educators, the meaning and nature of living with information technology. The discovery of the true understanding of the identified themes arose from an examination of related literature. The nurse educators' lived experience was one of personal and professional growth, a striving for personal and professional well being, and a positive reaction to the presence of an information technology environment. As one participant stated "I still find that I'm struggling with hanging on to old ways but yet trying to be innovative in delivery of programs which is something that I have as a goal for myself". For the participants, adjusting to the presence of information technology in their lives elicited varied responses. Some of the participants found information technology to be a positive motivator and they were quick to grasp learning new possibilities. For others, it led to a discovery of their personal limitations associated with the technology.

Throughout the interviews the participants demonstrated favorable attitudes toward their exposure to, and use of, information technology. This positive disposition characterized what appeared to be a base level acceptance of information technology in the academic setting. Participants verbalized their positive feelings towards information technology by discussing their awareness of access to information, the speed and the immediacy and the integration of information technology in their daily lives. Positive



feelings were also indicated by the participants' stories of improved relationships brought about by information technology and their recognized need to learn information technology skills. The supportive expressions were associated with the participants' use of computer based applications to assist with teaching responsibilities and with research. The use of electronic mail to enhance their connection with colleagues and their use of data based resources to heighten their awareness and access to information was also reviewed most favorably.

In the majority of situations the use of the technology did not appear to have progressed beyond elementary applications. Nurse educators appeared to be generally mere users of information technology. Intuition and innovation towards information technology were not common characteristics demonstrated by nurse educators. These were often reported as desirable attributes but lack of knowledge, longevity, and limited exposure and experience with various types of information technology precluded the acquisition of these attributes.

This level of acceptance and use of information technology by nursing faculty is similar to the G. P. Model for Computer Acceptance as described by Guttman-Pocklington (1981). This model described level one of acceptance as positive verbal expression by faculty towards computers and level two as correct utilization with faculty using computers according to their objectives. In this study, faculty provided positive verbal expressions and appeared to struggle between these two levels of acceptance and utilization of computers.

### **Communication: The Open Door to the World**

The nurse educators reported access to information and their ability to communicate with others was enhanced because of technology. For many, the immediacy and the quick access to information expanded their knowledge level of nursing topics and current issues. A common communication theme that emerged from the participants' stories was their use of electronic mail to connect with others for information and sharing of ideas and opinions. The findings indicated that many of the participants used e-mail as an essential communication tool regularly in their lives. E-mail had become an increasingly important and essential aspect of their networking to information and colleagues. Ward (1997) described electronic mail as a method for nurse educators to share documents, schedule appointments and work collaboratively with colleagues. Typical reference to e-mail is as follows:

E-mail is critical, you know, communication between even committees that you're on which is part of your duty with regard to nursing education and outside committees. There are members in probably five institutions and communication is instantaneous, whereas before, minutes and things took days or weeks to get. So even the frequency of meetings can increase because the workload with regard to getting to your work earlier is certainly there.

It is interesting to note that this study found the overwhelming utilization and verbal support for e-mail to be inconsistent with an earlier study of nurse educators' knowledge or acceptance of information technology which found only 6% of nursing

schools using electronic mail (Delaney, 1989). Although, being nine years later this study has shown dramatic changes in the experiences with e-mail. The participants' cognizance and use of e-mail as a valuable tool for exchanging information among colleagues has grown.

The participants' ability to communicate rapidly with other nurse educators across the province and the nation was viewed as eliminating the game of "telephone tag" and saving precious work time. This finding was consistent with the previous study of Dauvin (1995) which explored the perceptions of experienced users of the Internet and electronic mail in nurse education.

This study found that nurse educators' use of electronic mail provided the resource for the scheduling of appointments, discussion about various issues and sharing of knowledge which enhanced a collaborative effort among the faculty from all three sites. Participants believed they were better informed about meetings, appointments and any new issues within the nursing education environment. For the participants, daily use of the technology led to a sense of satisfaction and well being at work. The impact of the nurse educators' asynchronous schedules, and their geographical separation was softened by their daily access to electronic communications. These findings are consistent with a study by Stoughton (1996) which described the use of e-mail among emergency nurses at three different regionalized emergency department sites. The findings indicated that nurses had a better sense of being up to date, were able to schedule and announce

committee meetings and shared essential information and opinions among the nurses at the different sites.

The instantaneous exchange of information, the access to the same resources by all nurse educators and the fast paced flow of information among participants supported a collaborative practice among the nursing faculty. The reported advantage of speed and flexibility of this educational tool to nursing was consistent with the findings of the Saranto and Leino-Kilpi's (1997) study of required computer skills and the amount of information technology in nursing schools curriculum. It was interesting to note that the participants used the technology because of the recognized advantage to the enhancement of their external relationships among colleagues in nursing rather than just for the sake of using the technology.

### **Time: Ally and Rival**

Continuously seeking more time to successfully complete tasks and fulfill responsibilities in their work environment was identified as a core theme. In a study by Harri (1995), of nurse educators' experiences at work, nurse educators liked their work however, they disliked having too little time to complete their tasks satisfactorily.

In this study, time pressures at work were perceived by the participants as a significant feature of their working experience and hence, influenced what they felt they were capable of achieving and accomplishing while at work. This finding was consistent with identified high job demands and extreme time pressures among nursing faculty (Fong, 1990). Interestingly, the participants believed the access to information technology

helped relieve some of this work related pressure by assisting them in saving time. The ability to use word processing for lecture preparation, Power Point for overhead presentation, exam scanners for analysis and electronic mail for contacting others helped save precious time. This is consistent with the findings of Axford and Carter's (1996) study of computer users and computer non users who reported that the use of the computer saved time in the completion of tasks. Ngin et al. (1993) study of nurses' use of computerized documentation systems reported the use of this form of information technology assisted in making their work easier.

Lewis and Watson's (1997) study identified one of the most common barriers to the use of the computers by nursing faculty as the inability to find the time to learn. Many participants indicated that they would like to use more computer application programs in their work environment if only they could find the time to learn. One participant reported her desire to learn more about how to effectively use the Internet. However, at this time she did not feel she had the time to learn. The participants' perceptions of, lack of, or limited time was sometimes a struggle as they reported racing against the clock to complete tasks on time. A study by Hunter and Houghton (1993) frequently reported the most repeatedly mentioned workplace stressors by nurse educators was the lack of time to perform duties and learn new skills. The participants' coping with and adjusting to the limitation of time was continually mentioned in relation to coping with time pressures. Use of the technology appeared to alleviate the perceived pressures. As well, it was

expressed by many that possessing more time to attain more knowledge would alleviate some of their work related stresses.

### **Learning: Responsibility and Desire**

The exposure to information technology evident in educational pursuits coupled with their daily exposure to information technology stimulated the participants' interest and promoted their desire to learn more about the technology. This finding is inconsistent with earlier studies that reported that nursing faculty were resistant to learning and acquiring knowledge about information technology (Fields, 1983; Mikan, 1984).

Delaney's (1989) descriptive study investigated the acceptance of computer technology by nurse educators and administrators and found that an increased interest in obtaining more information about computer technology was a major response. This interest was also evident in this study as participants reported taking computer courses, seeking help from colleagues who had computer expertise and learning through reading manuals and hands on experience. Similarly Lewis and Watson's (1997) in their study of nurse educators' computer technology concerns after attending a computer workshop found that nurse educators who attended workshops were more interested in, and receptive to, the presence of computers, and had requested more information about the use of computers. In this study, as participants encountered and used technology in their work environment, they sought more knowledge about the technology. They also recognized that there were points of individual discomfort with certain forms of information technology, such as the Internet. A lack of intuitive knowledge about the

Internet and its potential advantages for nursing education was evident in the reports of participants in the study. Nurses reported being overwhelmed and frustrated by their lack of Internet knowledge and tended to be uncertain as to what path to take to achieve this knowledge and skill. This appears to be an important point as one recognizes that as the use of computer communications and the Internet increases in nursing education it is acknowledged that the Internet has opened up many opportunities in nursing education for data collection (Fawcett & Buhle, 1995).

There was evidence of a relationship between the level of knowledge about information technology and the participant's comfort level with the technology. These findings were similar to those of Lewis and Watson (1997) who also indicated that faculty's exposure to a computer workshop had increased their comfort level with the technology, but contradicted the study by Gonce-Winder, Kidd, and Lenz (1993) that found that nurse educators using computers identified some anxiety and apprehension toward their computer usage.

From a perspective of a desire to learn participants reported being motivated to master information technology, particularly those aspects that dealt with information technology in their daily operations at work and in their personal lives. This was consistent with Burke's (1991) study that showed a positive correlation between the nurse's use of information technology and their motivation to learn.

It would appear that mastering information technology skills was perceived as an individual personal responsibility. Participants' motivation to learn emerged from an

inner motivation and responsibility to achieve personal quality and accomplishment in their work. They reported their perceptions as a personal responsibility to attain the requisite level of knowledge and skill necessary to achieve a professional standard of excellence. They did not consider it as a responsibility of administration to provide the associated training, despite having expressed that work related information technology workshops had assisted them in acquiring some knowledge. Participants reported individually assuming personal responsibility to pursue courses or engage in independent learning to acquire the necessary skills. They pursued this self directed learning when on the job, with others, and by enrolling in courses and independent study. Findings by Clark and Dickinson (1976) reported that nurses participated more in self directed learning than in any other means of learning. Interestingly, later findings by Sinclair and Gardner's (1997) study which examined the perceptions of nurse educators on information technology issues were inconsistent with this observation. They concluded that educators who had received computer training were more willing and comfortable with using computers in the classroom. The need for regular inservice computer training was seen as a necessity for nurse educators. Hardin and Skiba (1982) also reported that educating nurses about computers was the primary responsibility of staff development and orientation programs (as cited in Armstrong, 1986).

The participants' motivation to acquire information technology skills emerged from their desire to achieve excellence, quality and an inherent feeling of pride in their work. These findings were partially explained in the study by Harri (1996) which found



that feeling competent at work and the need to develop oneself and learn continually was important for nurse educators. In this researcher's study, participants pursued various avenues to acquire knowledge that would provide them with this sense of competence in their work. A study by Ronald (1983) found a high level of knowledge about computer applications in nursing was reported as desirable by nursing faculty (Damrosch & Parks, 1985).

The participants' daily exposure to information technology was expressed as being very positive. This was evident as they spoke about their desire and their continuous pursuit to learn more about computers and applications. Consistent with Hill's (1985) study that attitudes can significantly influence a learner's readiness to learn, in this current study, the participants demonstrated a positive attitude and their willingness to learn by sharing their past and present methods of attaining knowledge about information technology.

The nurse educators' motivation to learn information technology was not reported as just undertaken for personal satisfaction and accomplishment, participants indicated another impetus sparked the motivation to learn as related to a sense of professional responsibility to the student. They expressed the desire to learn as much as possible about the technology to ensure their preparedness to offer students the advantages and benefits of learning through information technology. As well, participants reported that increased levels of knowledge and comfort with information technology improved their sense of personal competence in assisting students.

As the participants became more familiar with information technology, their sense of competence contributed to satisfaction with their working environment. The concept of competence was described by Harri (1996), in a study of nurse educators in Finland. She identified that the feeling of competence in their work and being able to meet challenges was very meaningful and satisfying to them. Nurse educators in the present study expressed similar feelings of satisfaction and competence when able to successfully utilize various information technology tools. It follows that nurse educators also experienced insecurity and feelings of incompetence when they encountered unfamiliar information technology.

Views that described what comprised the motivation to learn more computer applications was apparent in many of the participants' interviews. Nurse educators reported being aware of various computer programs but acknowledged their limited knowledge in particular areas. They recognized that personal lack of knowledge sometimes brought about feelings of frustration while it also promoted a desire to attain information and skills that would assist them in their daily tasks.

A survey of New Zealand nurses indicated that nurses required skills using the keyboard, information processing skills, word processing and accessing data bases (Hausman, 1990). The participants in the present study frequently reported they wished to know more about statistical packages, instructional tools and research tools. Nurse educators' acquisition of information about the computer as an instructional and research tool, the evaluation of the effects of computerization in nursing and the application of

computers with client education is viewed as essential knowledge for nurse educators to teach in nursing programs (Armstrong, 1986). For these respondents, learning was viewed as a continuous process that would ensure professional excellence in their roles as educators. The individual self identification relative to the ability to learn information technology was seen as desirable in the context of continual lifelong learning. This need to be personally motivated to learn was perceived as a role for an educator. As well, it was viewed as important for the guiding of students towards learning information technology.

Nurse educators identified that part of their role was to encourage students to gain an interest in and to use computers to assist them in their education and learning. As reported by one participant:

They (students) learn more efficiently, they learn more vast areas, so instead of just learning the basics and learning the specifics of it at a later time because of the information technology that's there, and they're access to so much information, not only now do they learn the essentials, but it's so broad that they can explore and examine any specific area that they wish in as much detail as they wish in the same time that it use to just learn the basics.

A perceived responsibility that would encourage students to use information technology, was consistent with other earlier findings of nurse educators' perceptions on their roles as educators (Bryson, 1991; Curl, Hoehn & Theile, 1988). The nurse educators felt that students should learn about computers, use computers and understand the

significance of the role of computers in nursing. A similar study of nurse educationalists from university and schools of nursing considered computer training for nursing students as a necessity (Chambers & Coates, 1990). Within this collaborative program, it is interesting to note that a computer course for students is not required at this time.

### **Technology: An Everyday Existence**

The everyday existence of information technology was a prominent theme in the analysis. All participants' reported having access to a computer in their offices. This finding contradicted Gonce-Winder et al. (1993) who found that despite the proliferation of computers in educational settings, nurse educators within many programs did not have computers in their offices. Having grown accustomed to information technology, participants found it difficult to function proficiently in their work related tasks without having the availability of the technology. Routine use included preparing lecture presentations, overheads, exam questions through Word Processing and Power Point, CINAL, e-mail and the Internet for communication and gathering information. One participant reported that tasks in the work setting had not changed but rather the process to achieving these tasks had changed with coincident advantages of efficiency, convenience and access to information. These observations were also consistent with findings on common uses of information technology by nurse educators and administrators (Thomas, 1985).

The participants' ability to function daily with increased speed and improved efficiency through the use of information technology necessitated the continual notion of

the technology being embedded in their lives. It was hard for some participants to envision not having information technology as a part of their working routine. Some of the experienced benefits of information technology were saved time, and improved quality and productivity of work. These observations were consistent with other studies of nurses using information systems in their daily practice and describing saving time in their documentation and having fewer errors in their paperwork (Hendrickson & Kovner, 1990; Pabst, Scherubel & Minnick, 1996; Williams & Brown, 1994).

### **Cost: Necessity and Choice**

The expense of the technology often entered the participants' stories. The technology was recognized as relatively expensive in relation to today's restricting education budgets. Yet they defended the expenditure as one that was essential to the advancement of nursing education. Participants' view of the cost of a computer system was often seen in a subjective manner. Participants expressed that if they identified the computer system as having benefits to them in their role as educators than the benefits outweighed the cost.

The tremendous pace of technological development and equipment upgrading were acknowledged as a major financial burden on educational institutions (Saranto & Tallberg, 1998).

### **Summary**

This study has presented many of the personal insights and experiences of nurse educators adjusting to the daily presence of information technology in a nursing

education program. Each story as told by the nurse educators is significant as together they bring focus to the myriad of issues, perceptions, feelings and opinions held by nurse educators in a dynamic nursing education environment. An objective of this study was to illuminate the nature of the nurse educator's experience with information technology. These findings were consistent with literature that determined the attitudes, needs and experiences of nurses and nurse educators in the health care system.

Experience with information technology was mostly positive. This was consistent with other research for the most part which identified this as being true for most nurses and nurse educators when working with information technology. The benefits of speed, efficiency, personal control, access to information and access to other colleagues was also consistently noted in similar studies. Participants identified motivation to expand their information technology knowledge and skills. There was no formal education route to follow. Participants individually paved their own course towards acquiring further knowledge and improving upon what they already knew. There were no outright negative reactions towards information technology, nor did experiences of the participants reveal an embracing of the technology. Participants positively adjusted and reacted to information technology as it entered their lives.

The nurse educators attempted to adjust to the technology through self learning, knowledge attainment and an acknowledgment of information technology's role in their lives. Information technology is a continual presence in their lives, with its positive rewards and its sometimes unclear promises for the future. Turkle (1983) stated,

“technology is a catalyst for change, not only in what we do but in how we think. It changes people’s awareness of themselves, of one another, of their relationship with the world” (p. 13).

The prominent similar themes that emerged from these nurse educators were:

1. The importance of having quick access and ability to communicate with others for information and opinions.
2. The motivation to learn more about information technology for personal and professional satisfaction, well being and competence. The participants’ inner desires and their external responsibility to students was an important aspect.
3. The continual searching for time and the identified value of saving time.
4. The daily integration of information technology that made it impossible to avoid and ignore information technology in their work and personal life.
5. The great cost of technology that sometimes outweighed the benefits yet, other times was seen as justifiable.

The final chapter discusses the implications for educators, recommended future research and a summary of the research.

## **Chapter VI**

### **Implications For Education, Recommended Future Research and Summary**

This phenomenological research explored the question of what is it like for nurse educators to live with information technology in an undergraduate nursing program. Each of the participants added unique stories of living with information technology to the study and many related experiences that were shared by the others. The analysis of the transcribed interviews uncovered the following five themes; each theme was divided into subsections:

- (1) Communication: The Open Door to the World
- (2) Time: Ally and Rival
- (3) Need to Learn: Responsibility and Desire
- (4) Technology: An Everyday Existence, and
- (5) Cost: Necessity and Choice

From these themes the essence emerged: “reacting to and adjusting with the entry of information technology into their lives - followed by embracing it for its promises”. The presence of information technology in their lives was an adjustment and an adaptation to the many changes that information technology brought. The majority of the changes brought benefits that enhanced their lives yet some changes caused a reaction that sometimes brought forth frustration and concern.

The insight gained from this study will contribute to nurse educators’ knowledge and nursing education as information technology becomes more prevalent in their



environment. These results may influence the further integration of IT into education that will subsequently influence the way in which nurse educators respond to this technology. Nurse educators are continuously adjusting to the impact of information technology in their work environment. The participants in this study reported lived experiences involving adjustment to the presence of information technology, of personal and professional growth and of initial discomfort followed by gradual acceptance of information technology in an increasingly pervasive computer educational environment. The participants were challenged by their own self expectations of quality and excellence in their teaching and the omnipresence of the information technology environment in which they found themselves everyday. The findings of this study have implications and suggest recommendations for nursing education and research.

### **Implications for Nursing Education**

The findings of this study indicated that the phenomenological method was an appropriate method for acquiring knowledge about nursing education. The method enabled the researcher to explore how nurse educators perceive information technology and make the adjustment and the integration of information technology into nursing education appear as a natural and essential process that would connect faculty to faculty, faculty to student, and faculty to broad sources of information. As educators become knowledgeable about the conditions that are necessary to effectively exploit information technology, perceptions may be further developed to reinforce and strengthen the presence of technology in nurse education. As Strength and Keen-Payne (1991) stated,

“Computer literacy will be an essential practice technology in the future of nursing” (p. 26).

The participants viewed information technology as a meaningful tool that could foster a climate of cooperative interaction between themselves and their colleagues both within and beyond the geographic confines of their own institutions. This study provided insight into how information technology also met the needs for greater efficiency, quality, and organization in the nurse educator’s work. In this context it would appear that learning needs of nurse educators for information technology have not yet been fully satisfied and that the process must be viewed as evolutionary or just becoming important within the profession. Continuing education appeared to be a prerequisite to keeping abreast of the fast paced changes that occur within and because of information technology. All of the participants acknowledged the importance of and articulated a need to keep current with the changes in technology. The nurse educators articulated a need to acquire various IT learning needs. Accordingly, it is recommended that educators acquire the necessary skill and knowledge to meet their own development needs as well as those of their students.

Expressing a desire to learn may be best articulated in terms of those structures that facilitate the same. It is recommended that the provision of accessible learning resources such as information technology courses, regular inservice sessions and knowledgeable resource individuals be facilitated in nursing education. Despite the growing amount of information technology present throughout nursing education, this

study found that acquiring some level of knowledge was necessary, in spite of the view that it was considered to be the individual responsibility of nurse educators.

As information technology continues to pervade the work environment, increasing the comfort levels of nurse educators with it will facilitate their adjustment and adaptation to computerization in education.

Sources of frustration reported by the nurse educators in this study were lack of information technology knowledge as well as various technical difficulty associated with handling the hardware and software. To successfully utilize information technology as an effective teaching strategy, it is recommended that resource personnel be made available to eliminate these irritants.

Nurse educators reported a need to feel comfortable with the technology before they are able to successfully transfer their knowledge and skills to their students. A sound knowledge base of the various uses and benefits of computers was seen as desirable by nurse educators to ensure students receive the best information technology education. Nurse educators sought a sense of self confidence and competence in information technology before they could meet the challenges of implementing this technology in the classroom, laboratories and clinical setting. To achieve this level of competence it is recommended that administration assume the responsibility of assisting nurse educators in furthering their information technology education.

Nurse educators are in a pivotal position to shape the design and development of information technology systems. It has always been the obligation of nurse educators to

keep current with developments in any component of nursing practice and education. As educators oversee the use of information technology in education and practice they must view themselves as the individuals who can best ensure that the potential benefits of information technology upon education and practice are fully realized. It is recommended that nurse educators collaborate with computer experts not only to ensure the enhancement of computer knowledge in education but also to impart their knowledge and unique skills into the development of the technology.

The findings of this study indicated that collaboration among nurse educators throughout the sites is critical to the effective and efficient delivery of nursing education. The social and professional support that emerged through information technology introduced nurse educators to resources previously beyond their reach. Nurse educators experienced the connection with colleagues that brought about a personal link to a world they previously considered difficult to access. It is recommended that collaboration within the nursing world be encouraged and facilitated through the advances that information technology offers. As well, it is recommended that all nurse educators be made aware and become familiar with this valuable resource that will support them in the provision of nursing education.

### **Recommendations for Future Research**

Nurse educators and administrators must be aware of and comfortably adapt to the latest technologies as they are preparing nursing students for entering the profession. This presents a challenge because nurse educators must be experientially prepared to teach

students in an increasingly technical environment. This phenomenological study, through self reports, helped to explore the multiple issues presented by information technology and to elicit the participants' understanding of the phenomenon. This study facilitated the emergence of the nurse educator's viewpoint and discovery of the meaning of the phenomenon. Bringing their experiences with information technology to the surface helped expand on the nurse educators' knowledge of the lived experience. It is recommended that further studies be conducted. This method of research would help to further explore nurse educators' understanding of their experiences which are embedded in the context of information technology.

Ongoing research is required to identify the most effective way in which information technology can be made an integral component of nursing education. Very little research has been done on the alternative means by which nurse educators could most effectively implement information technology into the nursing curriculum. Phenomenological research is an effective means of data collection to uncover how nurse educators experience and use information technology.

It is also recommended further research be conducted to evaluate the presence and use of information technology in nursing education. As the findings in this study indicated, the use of information technology is steadily increasing in nursing education. Even though information technology has been an integral part of nursing and nursing education for many years, there is limited research about nurse educators' experiences and the challenges they face daily.

### Summary

Nurse educators who are positive about and sensitive to their own educational needs may tend to be more sympathetic to their students' needs. The integration of information technology into the nurse educator's work environment and into the curriculum should facilitate a process whereby graduates of the undergraduate nursing program will acquire management information skills appropriate for the workplace.

Billings 1995 stated:

Although much has been written about developing computer competencies for nursing students and practicing nurses, little has been written about expectations for nursing faculty who educate these nurses. Because schools of nursing are connecting points for preparing graduates for an information-rich workplace, they must assume responsibility for preparing faculty for this new environment (p. 264).

This period of reform in nursing education in Newfoundland is an important time to discover nurse educators' true understanding of information technology. Only through their revelations will information technology become an important and integral aspect of nursing education curriculum. Manuel and Sorenson (1995) observed that there is currently a lack of computer literacy content in the majority of nursing curricula. An understanding of the nurse educator's experience with information technology can only assist all nurse educators in identifying the importance of further integrating information technology into their curricula.

Research in this area has stimulated other faculties to focus more research on the inclusion and implementation of information technology in their nursing programs. Research is necessary in this area to capture the benefits of information technology within nursing education. The results of this study provided information useful to facilitate the following outcomes: Those who would establish policy related to information technology and its integration into the nursing curriculum and nurse educator's future involvement in the design and development of software for the benefit of student's learning. This study provided a view of the experience of nurse educators and administrators who are living with information technology, and answers the question: "What is it like to live with information technology as a nurse educator in an undergraduate nursing program"?

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## **Appendix A**

### **Report on the Integration of Computer Technology in School of Nursing**

## 1995 REPORT Integration of Computer Technology in School of Nursing Basic Program

### Introduction

The need to investigate the future of teaching technology in the school, was identified in the 1993 strategic planning session. In particular, faculty were concerned about the need for students to be computer literate and to possess the knowledge and skills necessary to access and analyze the patient information systems used to manage care. Students need a variety of interactive "hands on" computer experiences which involve concrete professional nursing problems. As a result of that strategic planning session an ad hoc committee was struck to discuss recommended class content for specific courses and faculty needs.

### Class Content of New Program

To be computer literate involves having an understanding of computer history, computer terminology, computer use in nursing and moral and ethical concerns associated with using computers for managing patient information. There is extensive literature on the recommended class content concerning computer technology, for a baccalaureate in nursing program. Concepts that would be included in the curricula include the following: (1) history; (2) terminology; (3) critical thinking; (4) data base; (5) bugs; (6) privacy; (7) security; (8) consumer; and (9) communication (Fochtman & Kavanaugh, 1991). Skiba (1985) recommends several types of interactive experiences or exercises that would include the following: (1) keyboard; (2) DOS; (3) word processing; (4) file management, ie. bib references, mailing lists, drug cards, NCP; (5) research exercises, ie. stats, graphics, telecommunications and data base management.

Some of the recommended topics include the following: (1) how the computer operates; (2) clinical decision making systems; (3) patient information systems; (4) confidentiality; (5) legal issues; (6) history of computers and information systems; (7) expanding nurse's role in developing computer systems; (8) E-mail, internet and WWW; and (9) computer effects on nursing and patient care. As a result of this discussion, it has been suggested that the following courses integrate computer content into their class and/or laboratory sessions.

### New Curriculum

**N1001 Introduction to Nursing** - Introduction to computers with at least three hours of theory and one lab session. The lab should involve the session currently conducted by Jennifer Bates.

**N2013** - Two classes of three hours each, to address such topics as access, confidentiality, theory and application of patient information systems and GRASP.

**N2511** - All students should receive training at the first level of the patient information system (PIS) which involves access to information, ie. lab data, dietary and NCP.

**N2520** - All students should receive training at the second level of the PIS, which involves access of NCP and unverified orders, ie. manipulating data and changing NCP.

**N3110** - At least three hours to address computer management information systems, patient decision systems and the use of computers in management

**N3520** - All students should receive training at the third level of the PIS, which involves use of NCP and verified orders.

**N4104** - At least one three-hour class on the application of computers in the community.

**N4103** - One class in advanced computer theory and application with assignments in computer application.

**N4101** - At least two classes in computer based research exercises, ie. SPSS.

### Old Curriculum

**N2010** - as per N1001 and N2013 of new curriculum

**N3060** - Training at the first level of the PIS as per N2511

or

**N3360** - Training at the first level of the PIS as per N2511

**N3370** - as per 2520

**N4002** - as per N4104

**N4010** - as per N4101

**N5000** - as per N3113

**N5310** - as per N3520

**N5300** - as per N4103

**N5220** - faculty should stress computer issues as a topic for student presentation

### Faculty Needs

In relation to access to patient information systems, there ought to be a training program for new faculty (or faculty new to a particular institution) that is sanctioned by the staff development department of that institution. This is currently arranged by individual faculty, but there should be a formal link/agreement established with each institution to train faculty on the computer system.

### Student Needs

A reference list is provided as suggested resources for both faculty and students. An extensive literature search on computer knowledge and skills is also available from S. MacDonald if needed. This includes an internet bibliography.

- (1) Books owned by the School of Nursing, held in H-2912: (These books are available for sign-out or for use in H-2912.)

Manuals for all licensed software. Included are the following:

WP for Windows

SPSS for Windows - Base Module

Advanced Module

Professional Module

Aldus Persuasion - presentation package for slides and overheads

Nutrition

Essentials of Application Software, vol 1: Dos WordPerfect 5.0/5.1, Lotus 1-2-3 Release 2.2, dBase III Plus. S. Ross, J. Bacon and C. Copeland. West Publishing Company. New York, 1991.

WordPerfect 5.0 Workbook

The Nurse's Guide to Computers. M. Sweeney. Collier MacMillan Canada Inc. Toronto, 1985.

The Good Computing Book for beginners: PLUS a complete practical glossary of terms. D. Jarrett. Hutchinson & Co. (Publishers) Ltd. London, 1983.

Introduction to Computers and Information Processing. D. Cassel and M. Jackson. Reston Publishing Company, Inc. Virginia, 1980.

- (2) Some resources in other MUN Libraries:

Windows for Dummies: References for the Rest of Us. A. Rathbone. IDG Books Worldwide, Inc. San Mateo, California, 1992.

Location: MUN CMC - education building

Call number:

Introduction to Personal Computers: Self-Teaching Guide. P. Stephenson, John Wiley & Sons Inc. Toronto, 1991.

Location: MUN Stacks - QEII Library

Call number: QA 76 .27 S74 1991

Microcomputer Applications, Second Edition R. T. Grauer and P. K. Sugrue. McGraw-Hill Book Company. Montreal, 1989.

Location: MUN Stacks - QEII Library

Call number: QA 76 .5 G683 1989

Respectfully Submitted,

Sandra MacDonald  
Karen Webber  
Janet Curran-Smith



## **Appendix B**

### **Letter to Site Directors for Permission for Access to Faculty**

July 4, 1997

50 Empire Avenue  
St. John's, NF  
A1C 3E6

Dear

I am conducting a research study entitled "A Two Part Study to Determine the Nature and Need of Information Technology in the BN (Collaborative) Program in Newfoundland and Labrador" for the thesis component as part of the fulfillment for a Masters Degree from Memorial University of Newfoundland. I will be addressing the qualitative perspective in assessing the need for information technology and Karen Kennedy, a fellow student will be conducting the quantitative aspects. As faculty members at the Centre for Nursing Studies we have identified that the time and content allotted to information technology in undergraduate nursing curricula may not adequately prepare graduate nurses with the technological knowledge and skill required to support nursing in the 21st century. The population for the qualitative study will include faculty and administration at the three sites of the BN (Collaborative) Program in Newfoundland and Labrador. This research has been approved by the Ethics Review Committee of the Faculty of Education.

In this qualitative study the researcher will conduct unstructured interviews utilizing a questionnaire guide developed by the researcher which will be used to gather data from faculty and administration. Data collected from each interview will lead to the development and exploration of additional questions. I will request permission to audio-tape these interviews and make a written copy of the recordings. Confidentiality will be ensured by securing consent forms, audiotapes, transcripts and computer data in a locked file. Data will only be shared with members of the thesis committee. Within twelve months of the conclusion of the research study the interview data, audiotapes, computer discs and computer printouts will be destroyed.

Interviews will be scheduled within four weeks following notification of the participants intent to participate in this study. Participation is voluntary and participants have the right to withdraw from the study anytime or refuse to answer any questions if they so choose. The interviews will be scheduled at the participants convenience in a setting of their preference. Participants will be asked to meet the researcher for an interview session of approximately 30 - 60 minutes. The researcher will use a guided questionnaire of

approximately 8 - 10 questions to encourage and explore the participant's understanding and experience of working with information technology. The interview will be of an open format allowing the participants to freely and openly discuss their experience. Data collection will commence the fall of 1997.

I am requesting your support in writing for the participation of administration and faculty at your site in the gathering of this data. Enclosed is a consent form for you to sign and return if you are in agreement. If you have any questions or wish to discuss further the nature of the study, please contact me at 754-0082 or e-mail [cjhouse@nurse.nf.ca](mailto:cjhouse@nurse.nf.ca) or my thesis supervisor, Dr. George Hache at 737-7630 or e-mail [ghache@plato.ucs.mun.ca](mailto:ghache@plato.ucs.mun.ca) or Dr. Linda Phillips (Associate Dean of the Faculty of Education) at 737-8587. Thank you for your consideration of this request.

Sincerely,

Colleen House

## **Appendix C**

### **Consent Form (Site Directors)**

I, \_\_\_\_\_ hereby give permission for faculty and administration within the BN ( Collaborative ) Program at Memorial University School of Nursing to participate in “A Two Part Study to Determine the Nature of Need for Information Technology in the BN (Collaborative) Program in Newfoundland and Labrador”. I am aware that participation is voluntary. All information is strictly confidential and the anonymity of the faculty/administration will be maintained.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Director

## **Appendix D**

**Permission from the Ethics Review Committee  
Faculty of Education, Memorial University of  
Newfoundland and Labrador**



Faculty of Education

May 28, 1997

Dear Karen and Colleen,

After reviewing your resubmission, I am satisfied that you have addressed the concerns raised by the Ethics Review Committee. I would however, like to point out that a statement informing participants that they may refuse to answer any question be added to the letter to questionnaire respondents.

We wish you all the best in your work.

Sincerely,

T. Seifert  
Ethics Review Committee

cc: Dr. G. Hache

**Appendix E**  
**Consent Form (Individual Faculty)**



50 Empire Avenue  
St. John's, NF

June 18, 1998

Dear \_\_\_\_\_ :

I am a candidate for a Master's degree in Education. As part of my degree program I am conducting a research project entitled "A Two Part Study to Determine the Nature of and The Need for Information Technology in the BN (Collaborative) program in Newfoundland and Labrador". I am writing to full-time faculty who have taught in the BN(Collaborative) Program in the 1996-1997 academic year to request assistance with this study. With this letter, I have enclosed the "Consent to Participate" form which outlines the details of the study. Data collection will begin in August 1997.

If you agree to participate, please sign and return the consent form to my mailbox in the envelope provided. If you require further information or have any questions concerning this study, please contact me at 737-3694(w) or 754-0082(h) or email [cjhouse@nurse.nf.ca](mailto:cjhouse@nurse.nf.ca)

Sincerely,

Colleen House, RN BN.

Faculty of Education  
Memorial University of Newfoundland  
St. John's, Newfoundland

### **Consent To Participate In Research**

**Title:** A Two Part Study to Determine the Nature of and Need for Information Technology in The BN (Collaborative) Program in Newfoundland and Labrador

**Investigator:** Colleen House 754 - 0082

**Supervisor:** Dr. George Hache 737-7630 (Faculty of Education)

**Third person contact:** Dr. Linda Phillips 737-8587 (Associate Dean of the Faculty of Education)

**Purpose of the Study:** To is to explore the experiences of faculty and administration within the BN (Collaborative) Program with information technology. The results of this study maybe the impetus for nursing students and educators to value the comprehensive inclusion of information technology in the four year BN (Collaborative) Program as essential for the preparation of nurses for the 21st century. This study has received the approval of the Ethics Review Committee of the Faculty of Education.

**Procedure for Information Gathering:** The researcher will conduct unstructured interviews utilizing a questionnaire guide developed by the researcher which will be used to gather data from faculty and administration. Data collected from each interview will lead to the development and exploration of additional questions. I will request permission to audio-tape these interviews and make a written copy of the recordings. Confidentiality will be ensured by securing consent forms, audiotapes, transcripts and computer data in a locked file. Data will only be shared with members of the thesis committee. Within twelve months of the conclusion of the research study the interview data, audiotapes, computer discs and computer printouts will be destroyed.

**Duration of Participant Involvement:** Interviews will be scheduled within four weeks following notification of your intent to participate in this study. Your participation is voluntary and you have the right to withdraw from the study anytime or refuse to answer any questions. The interviews will be scheduled at your convenience in a setting of your preference. As a participant you will be asked to meet the researcher for an interview session of approximately 30 - 60 minutes. The researcher will use a guided questionnaire of approximately 8 - 10 questions to encourage and explore the participant's understanding and experience of working with information technology. The interview will

be of an open format allowing the participants to freely and openly discuss their experience

**Potential Benefits to the Participants:** There are no obvious benefits that are directly related to participation in this study. However, the knowledge gained through this study will improve the awareness of the need for information technology in the BN (Collaborative) Program. If requested, results of the study will be shared with the participants

**Anonymity:** Anonymity of participants in this study will be ensured through the use of code numbers of data collected.

---

I, \_\_\_\_\_, the undersigned, hereby agree to participate in a research study describing the need for information technology in a BN (Collaborative) Program. I understand that participation is entirely voluntary. The confidentiality of all information will be maintained and anonymity of all participants in the written report

---

Date

---

Signature of Participant

---

## **Appendix F**

### **Definition of Information Technology**

**Information Technology** refers to those systems (programs plus computers) used to manage and process information (Corcoran and Graves, 1989). It includes the use of software and computer technology specifically the use of computers for word processing, literature searches, internet and the world wide web access for information, the use of information systems, email and computer assisted instruction (tutorial, simulation, and drill and practice).

**Appendix G**  
**Guiding Questions for Interview**

### *Interviewing Format*

*Information Technology refers to those systems (programs plus computers) used to manage and process information (Corcoran and Graves, 1989). It includes the use of software and computer technology specifically the use of computers for word processing, literature searches, internet and the world wide web access for information, the use of information systems, e-mail and computer assisted instruction (tutorial, simulation, and drill and practice).*

*I understand that you have worked with information technology in the BN (Collaborative) Program. Can you tell me what it is like to work with information technology as a nurse educator administrator? Feel free to tell me whatever comes to your mind. Remember no detail is too little not to be important. Just tell me whatever you feel describes what it is like to work with information technology.*

#### *Personal Perspective*

*From your own personal experience with information technology can you share with me some of your thoughts and feelings.*

1. Describe your role as a nurse educator with the ascendancy of information technology in nursing education.
2. Describe your role as an administrator with the ascendancy/power of information technology in nursing education.

#### *Perspective from the BN Program*

*As a nurse educator can you tell me about your experience with information technology within the BN (Collaborative) Program.*

1. Thinking back to the introduction of information technology in the workplace, can you describe your feelings that may have had an impact on your use of information technology?
2. How do you feel about information technology in nursing education?
3. Reflecting back on your experiences with information technology in the workplace, do you feel nurses are prepared to accept the challenges of information technology?

#### *Teaching Perspective*

*From your perspective as an educator working with students and information technology can you tell me your thoughts about the experience.*

1. When working with students in the clinical area, can you describe your experiences with using information technology?

#### *Final question:*

*“Is there anything more about your experience with (the phenomenon) that you believe is important and that we may not have touched on?”*

**Appendix H**  
**Letter Sent to Experts**



50 Empire Avenue  
St. John's, NF.  
A1C 3E6

August 21, 1997

Dear

I am a candidate for a Master's Degree in Education. As part of my degree program I am conducting a research project entitled "A Two Part Study to Determine the Nature of and The Need for Information Technology in the BN (Collaborative) Program in Newfoundland and Labrador". The purpose of the study is to explore the experiences of faculty and administration within the BN (Collaborative) Program with information technology. The results of this study maybe the impetus for nursing students and educators to value the comprehensive inclusion of information technology in the four year BN (Collaborative) Program as essential for the preparation of nurses for the 21st century. Along, with an associate who is using a quantitative methodology on similar research I expect to triangulate my findings. This two part study has received the approval of the Ethics Review Committee of the Faculty of Education.

I will be conducting semi-structured interviews utilizing a questionnaire guide which I am proposing to use to initiate each interview.

The purpose of this letter is to seek your assistance in validating the research tool which I propose to use for my data collection. Because of your standing in the research and information technology community your comments and possible approval would enhance the credibility of the study's results. In this regard I am taking the liberty of enclosing a draft of the general guiding questions, a copy of the study's problem statement, and instructions. Once you have an opportunity to review the enclosed you may contact me at 737-3694 (w) Or 754-0082 (h) or e-mail [cjhouse@nurse.nf.ca](mailto:cjhouse@nurse.nf.ca).

Please accept my thanks for any assistance you are able to provide.

Yours very truly,

Colleen House RN. BN.

**Appendix I**  
**Critique Procedure Form for Experts**

The phenomenological method of qualitative research attempts to study the human experience as it is lived. It is an inductive descriptive research method.

To ensure that the phenomenon under study is explored to its fullest capacity, the researcher must approach the phenomenon with no preconceived opinion or beliefs and all data should be accepted as given by the participant. Research questions should be explicitly expressed and should flow from the phenomenon. (Parse, Coyne and Smith, 1985).

This study focuses on the experience of nurse educators with information technology in a BN (Collaborative) Program. The researcher intends to initiate each interview with the same open ended question. A review of studies utilizing the phenomenological approach tends to demonstrate studies that focused on a more personal experience with the phenomenon ie. a condition or a disease. Because of the nature of the phenomenon of information technology, participants may require guiding questions to ascertain the true lived experience of working with information technology.

Please review the following guiding questions for the following criteria:

1. Procedural rigor

- Validity? Is the researcher asking the right questions?
- Are the questions tapping into the subject's experiences, not their theoretical knowledge of the subject?

2. Clarity - unambiguous

- Are the questions clear?
- Are the sentences of sufficient length?
- Are technical terms clear?
- Do the questions have a disproportionate affirmative/negative tone?

3. Wording

- Are appropriate words and language used throughout?
- Are the words personal or impersonal?
- Level of information?

4. Neutrality - is their freedom from bias?

- Are there leading questions?

- Are there a range of alternatives in the question?

5. Are there too many questions?  
Which ones can be omitted?

## **Appendix J**

### **Letter to Participants Regarding Summary of Themes**

50 Empire Avenue  
St. John's, NF.  
A1C 3E6

June 18, 1998

Dear

The attached document is a summary of the themes that were identified from the seven participants through two rounds of interviews. I am forwarding this document to all participants to ask for individual feedback as to whether the identified themes represent your experience with living with information technology as a nurse educator. You may contact me at [cjhouse@nurse.nf.ca](mailto:cjhouse@nurse.nf.ca) or reply through the mail. Your continued participation in this research is greatly appreciated.

Yours truly,

Colleen House