

THE NEED FOR INFORMATION TECHNOLOGY (IT) IN  
THE BACHELOR OF NURSING (COLLABORATIVE)  
PROGRAM IN NEWFOUNDLAND AND LABRADOR AS  
PERCEIVED BY NURSE EDUCATORS AND STUDENTS

CENTRE FOR NEWFOUNDLAND STUDIES

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KAREN A. KENNEDY









**The Need for Information Technology (IT) in the  
Bachelor of Nursing (Collaborative) Program in Newfoundland and Labrador  
As Perceived by Nurse Educators and Students**

**by**

**Karen A. Kennedy**

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## **Abstract**

### **The Need for Information Technology (IT) in the BN (Collaborative) Program in Newfoundland and Labrador as Perceived by Nurse Educators and Students**

A descriptive correlational study was conducted to (1) to measure and explore the relationship between two variables, nursing student's level of perceived need for IT in their undergraduate nursing program and the nursing undergraduate faculty's and administration's level of perceived need for IT in the BN (Collaborative) Program; (2) to ascertain quantitatively and compare the views of faculty and administration and students in the BN (Collaborative) Program in Newfoundland and Labrador on the role of IT and health care, nursing practice and nursing education; (3) to measure the IT learning needs of faculty and administration; (4) to measure the IT learning needs of student's learning needs by faculty, administration and students.

Faculty and administration (n=17) and second year students (n=122) at the three sites of the BN (Collaborative) Program in Newfoundland and Labrador comprised the sample. The study utilized two researcher-developed surveys. High internal consistency was demonstrated for both surveys. Descriptive statistics were used for data analysis.

Findings indicated that both faculty and administration and students have a high level of perceived need for information technology in the BN (Collaborative) Program. Data indicated the positive views of both faculty and administration and students towards the role of information technology and health care, nursing practice and nursing education.

Findings revealed the information technology learning needs of both faculty and administration and students.

The study provided data that indicated both faculty and administration and student desire for knowledge and skill in the use of IT. This information may be used by the BN (Collaborative) Program in Newfoundland and Labrador to guide the implementation of information technology in the program to ensure the needs of both faculty and administration and students are met.

More research is needed on the identification of faculty's and administration's and student's IT learning needs in undergraduate programs that would guide curriculum changes, on the effects of implementing information technology on the student's marketability for employment upon graduation and on the demand for student admission to the program. Research is needed on the effects of using information technology applications as a teaching method on student learning and to validate the effects of using information technology applications on patient outcomes, nurses productivity and cost effectiveness.

**Key Words:** information systems, information technology, nursing informatics and undergraduate nursing program.

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## Chapter I

### Introduction

Information technology (IT) refers to both software and computers used to manage and process information (Graves & Corcoran, 1989). It includes the use of software and computer technology for a variety of activities such as word processing, literature searches, Internet and world wide web access for information, e-mail, computer assisted instruction (C.A.I.) such as tutorials, simulations, drill and practice activity and the use of information systems.

Ball, Douglas and Newbold (1995) suggested that the term *informatics* includes “all aspects of the computer milieu, from the theoretical to the applied. It covers learning how to use the new tools and building upon the capabilities provided by computers and other information technologies” (cited in Ball, Hannah, Newbold & Douglas (Eds.), 1995, p. 7). A more specific term, *nursing informatics* was defined by Graves and Corcoran (1989) as “a combination of computer science, information science and nursing science designed to assist in the management and processing of nursing data, information and knowledge to support the practice of nursing and the delivery of nursing care” (p. 227). The American Nurses Association (A.N.A.) recognized nursing informatics as a specialty in 1991. By 1994, the A.N.A. defined nursing informatics as the “specialty that integrated nursing science, computer science and information science in identifying, collecting, processing and managing data and information to support nursing practice, administration, education, research and the expansion of nursing knowledge”.

Nursing has been a practice-based profession that relies on up to date information, accessibility and quick retrieval of current nursing knowledge and research. The proliferation of IT in health care has challenged nurses in all areas of practice ranging from patient care to education and research. With relatively recent advancements in technology the base of knowledge has widened in this field and nursing undergraduate programs in Canada have been adjusted to provide students with the technological skill that were believed to be required in the practice of nursing.

The increasing use of computers in health care had a number of implications for nursing education. According to Grobe (1988) "Nursing's 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" (cited in McGonigle and Eggers, 1991, p. 184).

Sibbald (1998) reviewed the use of Canadian nursing informatics and indicated that even if nurses were motivated to learn about informatics, there were too few undergraduate courses or continuing education opportunities available to nurses. Hannah (1998) stated that informatics "should be the root of curricula across Canada" (cited in Sibbald, 1998, p. 30). 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). Henry (1995) stated "the improvements in information technology

and changes in health care policy have shifted the emphasis from single purpose systems to integrated communication networks with a variety of tools for knowledge workers” (p. 1189). A study at McMaster’s University by Van Dover and Boblin (1991), entitled “Student Nurses Computer Experience and Preferences for Learning” found that nursing students ages 20-50 would like more knowledge and skills to prepare them for careers in our increasingly computerized health care environment. The ability of nurses to use computers had generally opened the gates to the information highway.

### **Background and Rationale**

The Canadian Nurses Association (C.N.A.) is the national governing body of the nursing profession in Canada. Nursing in Canada has been defined by the National Nursing Competency Project as “a self-regulated profession, accountable to the public within the legislative context of provincial or territorial law” (p. 1). The Association of Registered Nurses of Newfoundland (ARNN) has been responsible for the advancement of safe, quality and competent nursing care for all in the province of Newfoundland and Labrador. The document, “The Standards and Criteria of Professional Competencies for Beginning Practitioners of Nursing, 1991” produced by the ARNN, identifies competencies that must be included in nursing school curricula in the province of Newfoundland and Labrador (see Appendix A). IT has not been reflected in these competencies.

The inclusion of information technology in undergraduate nursing programs has varied with each program in Canada. For example, the integration of information

technology into the curriculum is evident in British Columbia's Collaborative Nursing Program. It has provided students with both hands-on experiences and theoretical knowledge of IT. In Alberta, the Athabasca University Center for Nursing and Health Studies delivered an undergraduate-level course in nursing informatics and a graduate course in nursing informatics in the planning stage. At the commencement of this study, St. Francis Xavier University in Nova Scotia had a five week summer certificate program in nursing informatics.

As the above indicates, a review of nursing programs across Canada revealed that there is only little integration of IT into curriculums in undergraduate nursing programs in Canada and the BN (Collaborative) Program in Newfoundland and Labrador was no exception. The general disposition was described by Sibbald (1998) as "there needs to be a political will to recognize the importance of informatics, integrate it into curricula and initiate courses" (p. 30).

As at the date of this study, no research had been reported in Newfoundland and Labrador on the need for information technology in the BN (Collaborative) Program as perceived by nurse educators and students.

Motivational impetus for this study was three-fold: (1) The lack of documented evidence in describing the integration of IT, if any, in the present collaborative curricula; (2) The changing trends in nursing practice, nursing education and health care towards IT, with emphasis on quicker access to information and the expected delivery of excellence in

nursing education and patient care; (3) The general lack of basic IT skills by nurse educators and nursing students observed by this researcher.

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 IT will likely be more competitive and marketable for job placements in the nursing field. An important component of nursing education, therefore, has been accessing and keeping up to date on important information and nurses as a group need to become more conversant with IT knowledge and skill that can provide them with this information.

### **The Problem**

With incomplete information to describe the nature of information technology in nursing education it was uncertain to what degree graduates were adequately prepared to adjust to the increasing presence of information technology in the profession. The BN (Collaborative) Program in Newfoundland and Labrador did not deliberately include information technology in its curriculum. Although trends in nursing and health care indicated that there was a need for undergraduate nursing programs to include instruction in the use of IT, the BN (Collaborative) Program in Newfoundland and Labrador did not do so in a deliberate manner. Moreover, faculty's and administration's and students' perceived need for the inclusion of information technology in the BN (Collaborative) Program was not known. Lastly, there was incomplete information available to describe



faculty, administration and student views on the role of information technology and health care, nursing practice and nursing education in general in Newfoundland and Labrador.

### **Purpose**

The need as perceived by faculty, administration and students for inclusion of IT in the BN (Collaborative) Program in Newfoundland and Labrador has not been measured. The purpose of this study was thus four-fold: (1) to explore the relationship between two variables, nursing student's level of perceived need for information technology in their undergraduate nursing program and the nursing undergraduate faculty's and administration's level of perceived need for information technology in the BN (Collaborative) Program; (2) to ascertain quantitatively and compare the views of faculty and administration and students of the BN (Collaborative) Program in Newfoundland and Labrador on the role of information technology and health care, nursing practice and nursing education; (3) to measure the faculty's and administration's learning needs for applications of information technology; (4) to measure the student's learning needs for applications of information technology by faculty, administration and students.

Results of the study provides nurse educators in the Province of Newfoundland and Labrador with data regarding the need for information technology as perceived by students and faculty and administration. Results also provides data to further describe the learning needs of faculty, administration and students and as such can be useful to those who develop curricula and guide the development and implementation of professional development sessions for the nursing profession.

### **Limitations**

There were several limitations in this study. The use of a survey to collect data is limiting. The infancy of the BN (Collaborative) Program in Newfoundland and Labrador had a limiting effect on both the student, faculty and administration sample. The most senior students for this research study were second year students who had limited exposure to information technology application experiences in the clinical setting. The faculty and administration sample was limited to those who had taught in the program which, at the time of data collection, was only one year of the BN (Collaborative) Program. The access to participants who had adequate experience and knowledge of information technology may have been a limiting factor. The possible lack of experience and knowledge of information technology and its application to nursing and health may have limited the final results of this study. The restricted characteristics or homogeneity of the sample, faculty, administration and students, from the three sites of the BN (Collaborative) Program in Newfoundland and Labrador, can be viewed as limiting the generalizability of the findings to another population.

Participants, knowing that information technology is generally accepted as essential to nursing and health care, may have been compelled to answer the questions because they may have perceived that they would be judged favorably by their peers and the researcher. Shaughnessy and Zechmeister (1990) refer to this as "social desirability" (p. 106). This response may limit the findings of this study.

Willingness of sample to agree to participate has influenced the amount and type of data collected and, therefore, limit the study findings. The lack of comparison studies posed problems. Differences in variables and methodologies preclude comparing the results of this study with other findings. Without these comparisons, it was difficult to make firm conclusions.

The evolutionary process and the dynamics of change of information technology within health care often cause studies to become outdated and irrelevant very quickly. This process may have also played a role in limiting the findings of this study.

### **Definitions**

For the purpose of this research study, the following terms were applied:

Information Systems - Are the primary source of 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).

Information Technology (IT) - Refers to those systems (program plus computers) 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 World Web access for information, e-mail, and computer assisted instruction (tutorial, simulation, and drill and practice) and the use of information systems.

Nursing Informatics - "A combination of computer science, information science and nursing science designed to assist in the management and processing of nursing data, information and knowledge to support the practice of nursing and the delivery of nursing care" (Graves & Corcoran, 1989, p. 227).

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 is the minimum requirement for entry to practice for nurses in Canada by the year 2000.

### Summary

This chapter introduced the view that would suggest that a study is needed to review information technology that has been included in undergraduate nursing curricula. A brief overview of the existence of IT in some undergraduate programs in Canada has demonstrated little deliberate inclusion is evident in undergraduate programs. As well, a lack of nursing research on the measurement of faculty's, administration's and students' need for IT in their undergraduate programs. It was concluded that there was a need for research (1) to measure and explore the relationship between two variables, nursing student's level of perceived need for IT in their undergraduate nursing program and the nursing undergraduate faculty's and administration's level of perceived need for IT in the BN (Collaborative) Program; (2) to ascertain quantitatively and compare the views of faculty and administration and students in the BN (Collaborative) Program in

Newfoundland and Labrador on the role of IT and health care, nursing practice and nursing education; (3) to measure the IT learning needs of faculty, administration and students. It was believed that through such research undergraduate nursing programs would acquire more useful data to assist faculty and administration plan for inclusion of information technology programs. The rationale and purpose for the study has also been identified. Chapter II will review relevant literature to further describe the role of IT in the profession of nursing and nursing education.

## **Chapter II**

### **Literature Review**

The literature review was focused on four main areas: the attitudes of nurses towards computer technology; the role of information technology in nursing education; applications of information technology in nursing education and applications of information technology to nursing practice.

#### **Attitudes of Nurses Towards Computer Technology**

Thomas (1988) stated, "the promotion of positive attitudes towards computers is essential if nurses are to use computers in optimum ways in both educational and practice settings" (p. 122). Research on nurses' attitudes and variables that may affect nurses' attitudes towards computer technology has spanned the last 30 years. Variables that may have an effect on nurses' attitudes towards computer technology such as age, educational preparation, computer use experience, area of work and length of nursing experience have been studied. However, overall results have been inconclusive.

Studies by Friel, Reznikoff and Rozenberg (1969) and Krampf and Robinson (1984) indicated that age affected the attitude of nurses towards computerization. The younger the nurses, the more positive their attitude towards computer use. However, 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 & Jasion, 1992; Sultana, 1990). Many researchers have used the instrument, Nurses Attitudes Towards Computerization (NATC) to measure nurses' attitudes

developed in 1985 by Stronge and Brodt (Bongartz, 1988; Brodt & Stronge, 1986; McBride & Nagle, 1996; Scarpa et al. 1992; Schwirian, Malone, Stone, Nunley & Francisco, 1989).

Although nurses' attitudes towards computers has become increasingly positive, resistance to use and negative attitudes towards computers has often been attributed to lack of knowledge of computers, how they work, and how nurses might use computers today and in the future (Abbott, 1993). McBride and Nagle (1996) examined factors that influenced nurse's and nursing student's attitudes towards computers. Findings indicated that both groups had a somewhat positive attitude towards computers. A study of staff nurses by Simpson and Kenrick (1997), found that overall nurses had a positive attitude towards computer use. However, the percentage of nurses with positive attitudes was only 54.3%. Findings indicated that younger nurses had more positive attitudes towards computers.

Studies on the effect of educational preparation on nurses' attitudes toward computers has been inconclusive. Brodt and Stronge (1986) concluded that the higher the educational preparation of nurses the more positive their attitude towards computerization. They also found that nursing administrators had a higher educational level which indicated a plausible rationale for their more positive attitudes towards computers. More recent studies indicated that educational preparation did not correlate with a favorable attitude towards computers (Burkes, 1991; Simpson & Kenrick, 1997; Sultana, 1990).

The results of studies on the relationship of the length of nursing experience with a positive attitude towards computer use has been inconsistent. Brodt and Stronge (1986) noted that nurses with greater than 21 years of nursing experience had more positive attitudes towards computer use than nurses with less than 10 years of nursing experience. Bongartz (1988) measured the attitudes of staff nurses in groups of users and nonusers of computers and found there was no correlation between the number of years worked in nursing with the total attitude score (Scarpa, et al., 1992; Sultana, 1990). Simpson and Kenrick (1997) found that nurses with a shorter length of time as a trained nurse had a more positive attitude towards computer use.

Some studies have indicated that area of work may influence the nurses attitude towards computer use. Brodt and Stronge (1986) noted that more approving attitudes were seen towards computers among nurses working in rehabilitation, pediatrics and in nursing administration. They reported that these nurses had more positive attitudes towards computer use than nurses working in medical-surgical areas. Simpson and Kenrick (1997) study revealed that nurses who worked on the elderly care unit, rehabilitation and medicine had more negative attitudes towards using computers. However, other studies found that area of work did not affect the nurses' attitudes towards computer use (Burkes, 1991; Scarpa, et al. 1992; Sultana, 1990).

Brodt and Stronge (1986) found that there was no relationship between the attitude of nurses towards computer use and the nurses amount of interaction with computers (Sultana, 1990). Bongartz (1988) found that nurses in the computer nonuser



group had more favorable attitudes towards computers (Burkes, 1991). Schwirian et al. (1989) compared the attitudes of nurses and nursing students towards computer use and found that the greater the exposure to computers and familiarity with computers, the more positive the attitude. Other, more recent studies have found that nurses with previous computer experience had an overall positive attitude towards computers (Scarpa, et al. 1992; Simpson & Kenrick, 1997). Nurses' attitudes have been identified as a key variable for successful implementation of clinical information systems (Brodt & Stronge, 1986). Ngin, Simms and Erbin-Roesemann (1993) investigated the relationship between work excitement and level of self-perceived computer skills of nurses found that computer users were more positive towards computer use than nonusers. McBride and Nagle (1996) findings suggested there was no relationship between computer experience and nurses attitude towards computer use.

Studies have questioned the validity of Stronge and Brodt's (1985) Nurses' Attitudes Towards Computerization (NATC) instrument. The findings of the studies indicated a lack of support for the construct validity of the instrument (McBride & Nagle, 1996; Murphy, Maynard & Morgan, 1994; Scarpa et al. 1992; Schwirian et al. 1989; Stockton & Verhey, 1995). Murphy et al. (1994) attributed the inconclusive results of the research on attitudes using the NATC (1985) instrument to the diversity of nursing populations that have been studied using the same instrument. Development of instruments to measure attitudes of nurses towards computers has continued (Jayasuriya & Caputi, 1996). As computers and technology become a growing part of nursing and

health care, admitting a negative attitude might evoke an unsettling and negative response from others and may have contributed to the somewhat contradictory findings.

The studies on nurses' attitudes towards the use of computers over the last 30 years have demonstrated contradictory findings. Research has not provided results that indicated that variables such as age, educational preparation, years of nursing experience or clinical area of work influenced a positive or negative attitude by nurses towards the use of computers. The ubiquitous presence of IT in health care today may negate the need for more research on nurses' attitudes towards computer use.

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

The extent of information technology included in nursing undergraduate curriculum in Canada is difficult to examine because of lack of documented research. However, a search of international nursing literature related to information technology and nursing education revealed a number of studies on faculty and student perceptions and needs related to IT in undergraduate nursing programs.

A study by Armstrong (1986) investigated the extent of present and future needs of computer competence for nurse educators teaching in basic and continuing nurse education programs. The findings indicated the present competency needs of nursing education curriculum which included how to use a computer as an instructional tool, knowledge of computer technology, the role of nurses who interact with computer technology, and use of the nursing process with charting and developing nursing

careplans. Armstrong (1986) indicated that the future of nursing education should include the use of computers as a tool, for use in instruction, research, and evaluation.

Delaney's (1989) descriptive study investigated the acceptance of information technology by nurse educators and administration in 36 undergraduate programs and found that faculty and administration knowledge of computers is greater than they perceive and that both groups have a positive attitude toward the use of computers.

Chamber and Coates (1990) conducted a study in the United Kingdom to determine the nature of computer training that would be included in degree, non-degree and post basic nursing programs. This study revealed that there was widespread interest in computer training in nursing. Eighty percent of nurse educators in university nursing programs and schools of nursing felt that the inclusion of IT in nursing curriculum was vital. However, there was also a great variation and much diversity of computer training at both universities and schools of nursing.

Bryson (1991) explored the perceptions of nurse educators regarding the extent of computer training in nursing education and results indicated that the majority of nurse educators expected nursing students to have computer skills. However, nursing students were entering into degree programs ill prepared and only one-fifth of nursing programs had a mandatory computer course in their curriculum. Nurse educators believed that it was essential for nurses to have knowledge of computer technology and this knowledge would provide greater opportunities and advantages for those in the nursing profession (Heller, Romano, Damrosch & Parks, 1985; Todd, 1998). Andrei (1992) stated,

“outdated curriculum models focus on primary nursing but lack content in supervision and delegation and computer literacy” (p. 202). Sinclair and Gardner (1997) descriptive study examined the perceptions of nurse educators on information technology issues in five nursing colleges in Northern Ireland. These nurse educators suggested the need for a unified policy on the use of information technology in nursing education, and reported that regular information technology inservice training provided a level of comfort and competence in the use of computers and educators who received computer training possessed a greater interest in using computers in the classroom.

Lewis, Watson and Newfield (1997) described the process for implementing technology both at the undergraduate and graduate level. They reported that there was a need to move quickly with this process, to keep pace with the changing information age. Lawless (1993) stated “few would argue that incorporating computer instruction into basic nursing education is necessary to ensure that program graduates are enabled to furnish meaningful contributions to their nursing practice” (p. 264). Curl, Hoehn and Theile (1988) presented the process for the implementation of an upper division required course, Computer Applications in Nursing, and indicated that the course helped to bridge the gap between nursing and computer science and provided a basis for professional nurses to articulate their nursing needs to computer professionals.

The University of Maryland implemented the first graduate program in nursing informatics in the fall of 1989 in response to an established need for master’s level nurses (Heller, Romano, Moray & Gassert, 1989). McGonigle and Eggers (1991) developed a

proposed certificate program to prepare nurses to effectively utilize computers and information technology. Vanderbeek, Ulrich, Jaworski, Werner, Hergert, Beery and Baas (1994) developed an education plan for educating nurses in informatics at an undergraduate level. Graves, Amos, Heuther, Lange and Thompson (1995) described the development of a graduate program in clinical nursing informatics at the University of Utah and stated "the need for comprehensive inclusion of information technology in undergraduate curricula was necessary to prepare nurses for higher level learning in specialty learning" (p. 61). Arnold (1996) conducted a survey to determine the informatics educational needs of nurse educators, nurse managers and informatic nurses. Findings indicated that overall findings indicated an interest in obtaining a graduate degree of certificate in informatics. Saranto and Leino-Kilpi's (1997) studied the amount of information technology that should be included in nursing curriculum. They supported the teaching of information technology through an integrated approach with laboratory and hospital settings and recommended an 80 hour course to be taught by a nurse educator with an informatics specialty.

Research has indicated the positive views of nurse educators towards inclusion of IT in curricula and the need for a unified policy on the use of IT in nursing education. The aim of further research should be to identify and evaluate information technology content for inclusion in nursing undergraduate curricula and identification of IT learning needs of nurse educators and students.

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

Nursing is a practice-based profession that relies on up to date information, accessibility and quick retrieval of current nursing knowledge and research. The following provides a review of specific IT applications in nursing education that may improve nurse educators and students access to information, enhance the teaching learning process and facilitate interaction with colleagues across the country.

Teaching clinical decision making in nursing education has been a challenging endeavor. Lowdermilk and Fishel's (1991) experimental study evaluated Computer Assisted Instruction (C.A.I.) simulations as a means to enhance computer literacy, facilitate decision making and improve student achievement. Findings indicated that students who used C.A.I. did not score significantly higher than those who used traditional methods, they had positive attitudes related to C.A.I. simulations and 60% of students who used C.A.I. expressed an interest in future learning experiences using C.A.I. simulations (Wong, Wong & Richard, 1992).

Clark (1991) evaluated the use of interactive videodisc instruction (I.V.D.I.) at 504 National League of Nursing Baccalaureate programs. Findings indicated that using I.V.D.I. provided an efficient and effective teaching medium for students and enhanced the ability of the nursing student to independently make clinical nursing decisions. Findings revealed that the major disadvantage was the cost of the I.V.D.I. hardware and software. Calderone (1994) studied the effect on learning and attitudes towards instruction that used C.A.I., both with and without I.V.D.I. Findings indicated that the effectiveness of

computer instruction on learning and attitudes varied and that group instruction was more efficient and usually with less loss of cognitive achievement. Research findings have revealed a generally positive attitude towards I.V.D.I. as an instructional strategy (DeAmicis, 1997; Napholz & McCanse, 1994; Walker & Ross, 1995).

White (1995) described the development of computer-based patient simulations with the interactive video for nursing education. The findings indicated that the technology was generally effective. However, it was anticipated that future interactive video would be replaced with CD-ROM technology. A later study by Weis and Guyton-Simmons (1998) discussed the development and implementation of a computer simulation with associate degree students. Students were found to be motivated to interpret data, make independent decisions and develop a nursing action plan. Findings also revealed that students who had increased clinical experience performed better on the test and students with computer experience demonstrated less frustration and anxiety. Williams and Benedict (1990) studied the use of laptop computers and C.A.I. in a nursing course. Their findings indicated that students had a positive attitude towards computer use and enjoyed the time flexibility that the instruction provided.

Schmidt, Arndt, Gaston and Miller (1991) conducted an experimental study to examine the effects of traditional teaching methods with those of Computer Managed Instruction (C.M.I.). Their findings indicated that students did not have a preference for one method and there was no statistical difference in final content achievement scores

obtained from the experimental group and the control group (Halloran, 1995; Klassens, 1988; Lowdermilk & Fishel, 1991).

Computerized Clinical Simulation Testing (C.S.T.) has been used to facilitate and evaluate the development of the students decision making. Bersky and Krawczak (1995) discussed the developmental process and the future implementation of a nursing activity database during a C.S.T. for nursing students writing the National Council Licensure Examination (NCLE). This type of computerized testing permitted the student to carry out a full range of nursing activities without the use of prompting cues. The system was viewed as capable of evaluating the presence of independent decision making in simulated client situations. A later review by Bersky, Krawczak and Kumar (1998) of the C.S.T. process attests to the benefits of the testing procedures when used on students as C.S.T. facilitated the development of student decision-making skills.

Several nursing studies and reviews have centered on other uses of information technology in nursing education. Strength and Keen-Payne (1991) discussed the implementation of a computerized patient care system in a baccalaureate curriculum which was designed for charting at the bedside. Students consistently rated the experience of using bedside computers in the skills labs as helpful and interesting. Doorley, Renner and Corron (1994) discussed the implementation of connecting the student computer lab to a hospital information system in an undergraduate nursing program. Student benefits of being connected to a hospital information system (H.I.S.) included improved skills for



decision making, increased exposure to the reality of nursing and increased enthusiasm and motivation for learning.

Cragg's (1994) qualitative study evaluated the effect of a university's nursing care delivered through computer mediated conferencing (C.M.C.) on students. Students reported feelings of comfort, self-adequacy, group cohesiveness and a personal savings of time. However, students expressed frustration with the lack of available technical support.

Birx, Castleberry and Perry (1996) evaluated the computer attitudes, knowledge, and skills outcomes of undergraduate nursing students who used laptop computer technology in an undergraduate nursing program. Findings indicated no statistical significance between the user and nonuser computer attitudes. However, the use group made significant improvements in acquisition of computer skills and knowledge. Thomson (1998) described how the use of multimedia techniques in the classroom can enhance learning by essentially creating an exciting learning environment for the student.

The use of computer technology in nursing education not only included instructional programs for students but also included programs to facilitate the tedious task of maintaining students' records. Bingham (1997) described the development of a computer software program for a baccalaureate nursing program that used a university's academic advisement database. It was reported that the time required for processing applications had decreased from 16 hours to 2 hours. Users of this software program also reported that it allowed easy and quick access to statistical and research base information.

Using a computer network has become an essential skill that ensures nurse educators are able to access the most current information and link to other nursing colleagues. Halstead, Hayes, Reising and Billings (1995) described the development and implementation of a student-based computer information network to facilitate computer conferencing at two university nursing programs. Their findings indicated that computer conferencing enhanced collaborative learning and communication between faculty and students. Todd (1998) described the benefits of including the use of e-mail in an undergraduate nursing course as increasing students' critical thinking skills and enhancing the learning process by connecting students and faculty. Findings indicated that the majority of students were positive with their responses on the use of e-mail and recommended that it be used as an integrated learning tool in future courses.

Bachman and Panzarín (1998) evaluated the impact of implementing an Internet based course for undergraduate nursing students. Findings indicated that the pilot group had a higher number of hours of computer use, a higher level of computer knowledge and a more favorable attitude towards computer use than the comparison group.

Studies on the effects of using C.A.I. on student learning have been inconclusive. Future research is needed to evaluate the effects of using C.A.I. on student learning. As the utilization of IT applications for teaching by nurse educators increases it may generate more timely research studies on the effects of using C.A.I. on student learning and active participation by nurse educators in the design and development of IT applications for teaching.

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

Simpson (1997) stated, "the NEW HOSPITAL enterprise-supported by advanced information technology solutions - promises great advances in providing longitudinal patient care" (p. 85). He went on to describe numerous applications of information technology that could enhance nursing practices in hospitals.

"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 C.I.S. include patient care information systems, nursing information systems, medical information systems and patient care management systems" (Axford & Carter, 1996, p. 156).

Although research has been conducted on the benefits of using C.I.S. in nursing, findings have been inconclusive. Lewis, Carver and Roberts (1992) studied the effect of implementing a computerized clinical system in a hospital and found that patient care was more effective and documentation was more complete. Minda and Brundage (1994) studied the effect of automating nursing documentation using bedside terminals in an intensive care unit. Their findings indicated that there was a 20% decrease in the time required for documentation and an increase in the number of nursing observations recorded. Henrickson, Kovner, Knickman and Finkler (1995) evaluated the effects of using computerized bedside terminals by nursing and found that patient care improved and documentation was more timely and readable. They noted that nurses were concerned

with the increased volume of documentation as a result of using a computerized system (Adaskin, Hughes, McMullan, McLean & McMorris, 1995).

Brown, Cioffi, Schinella and Shaw (1995) measured the impact of bedside terminal systems on nursing care and found that direct patient care decreased, attitudes were less positive and the rate of medication errors were unchanged. Pabst, Scherubel and Minnick (1996) studied the impact of using bedside documentation technology on nurses' use of time. Findings indicated that those nurses who used the automated unit increased the time spent in patient care activities (Adderley, Hyde & Mauseth, 1997). Marasovic, Kenney, Elliot and Sindhusake (1997) used comparative observational design and work sampling to compare the use of an automated versus paper-based documentation process by nurses. Their findings did not provide definitive information regarding the advantages of automated documentation over manual documentation and recommended additional research in this area.

In a more recent study, McDaniel (1997) conducted two pilot investigations to evaluate a database for managing patient care information. His results indicated that having real time data entry by nurses who used an automated medical record management system that was linked to a relational database of clinical information was warranted, particularly for the evaluation and improvement of patient care. Geraci (1997) described the process of automating nursing records in a home care facility. Staff reported a reduction in the time nurses spent on clerical tasks, improved communications between

departments, improved accessibility to patient records from the field and improved ability to collect assurance data.

McFarland (1995) discussed the importance of nurses being computer literate in connection to the prevalent use of expert information systems designed for health care. It was suggested that expert system technology would be core components of information systems in the 21<sup>st</sup> century. Axford and Carter (1996) explored the expectations and beliefs among nurses regarding the impact of computerized nursing clinical information systems in their practice. Slow computer time was found to have a negative effect on users. They concluded that, generally, nurses expect positive outcomes of C.I.S.

Tronni and Welebob (1996) used a nonexperimental comparative study to measure nurse's satisfaction with a patient oriented educational software application. They also contrasted user satisfaction with manual and computer-generated materials. Results indicated a general higher degree of nurses' satisfaction with the computer software application.

Jones and Houston (1994) 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" (cited in Zerwekh & Claborn, 1994, p. 224). Their findings indicated that

research that was developed to validate computers contribution to nursing productivity to date has been inconclusive.

Manning and McConnell (1997) advocated a framework for technology assessment process that would generate questions that aid in the selection of a Nursing Information System. This would in turn facilitate the goals of providing cost-effective, high-quality patient care. They stated, "nursing information systems of the future must do more than simply support various tasks. They must provide strategic resources for clinical nursing practice. The systems must be data driven and nurses must make decisions about their design, development, selection and evaluation" (p. 141).

Fawcett and Buhle (1995) used the Internet to survey cancer survivors of their experiences of coping with their diagnosis and treatment. Some researchers who have used the Internet as a data collecting tool have noted that a low response rate and unrefined sample characteristics of participants were limiting factors which made generalizations difficult (Fawcett & Buhle, 1995; Murray, 1996a). Nurses have been quick to point out the potential of electronic networks for enhancing collaboration in international research (Holtzclaw, Boggs & Wilson, 1993; Sparks, 1993). Use of the Internet for research has been generally viewed in its infancy and research issues that are based on the Internet are at best evolving (Murray, 1996a). Murray (1996b) noted that the increase in sharing of knowledge from using the Internet would benefit nurses.

Lakeman (1997) focused specifically on the use of e-mail, world wide web questionnaires and the possibilities of virtual focus groups for collecting data and the ease

of nurses having access to this information. Hardey (1996) noted "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 multi-disciplinary in nature and supported by a number of underpinning disciplines. The emergent academic world mediated by the WWW will promote inter-disciplinary work and the seamless flow of information exchange" (p. 5). Murray (1996b) conducted a qualitative discourse analysis on the exchange of information and subsequent discussions on the NURSENET list server. Findings indicated that subscribers to NURSENET were mostly female and North American. However, a higher proportion of males contributed more frequently. Other findings by Murray indicated that there was a general absence of antisocial on-line behavior and that computer mediated communications users may actually challenge nursing discourse.

Anthony (1997) discussed the benefits of nurses' use of electronic journals that appear on the Internet. They seem to be as current as their paper counterparts. Bair, Brown, Pugh, Borucki and Spatz (1996) reiterated the importance of nurses having the skill and knowledge to access the Internet and find databases of current information (Newbold, 1995).

Newbold and Jaffee (1995) suggested in their role a practice nurse would need to include activities such as "on-line literature searches, posing questions to colleagues on an e-mail mailing list, and post queries to news groups" (cited in Ball, Hannah, Newbold & Douglas (Eds.). p. 58). Stoughton (1996) discussed the implementation and evaluation of

using e-mail in an emergency department. Staff nurses reported that e-mail led to improved communications within the department.

Shellenbarger and Thomas (1996) indicated that there was a need for nurses to develop a home page for the purposes of recruitment and publicity and that nurses need to be active with technological advancements in general. Levy and Fleck (1997) stated, "if nurses are to respond to health care changes and provide the best available patient care, then they must be prepared to embrace current information technology into their practice" (p. 5).

Research has been inconclusive in validating the effects of using C.I.S. on nursing productivity, patient outcomes and cost effectiveness. While the use of the Internet and on-line activities were used by nurses, use appeared to be at an infancy stage. As the use of IT applications by nurses increases, it may be anticipated that research on the effects of Internet use on nursing practice and research may evolve.

### **Summary**

This chapter has presented a review of the literature related to the attitudes of nurses towards computer technology, the role of information technology in nursing education and the applications of information technology to nursing education and practice. The attitudes of nurses towards information technology and role of information technology in education and practice is important to understand the need for IT in the BN (Collaborative) Program in Newfoundland and Labrador. However, results of much of this research to date has been inconclusive. Nursing is seeking data which may warrant



the use of information technology in practice and education. Research findings on the use of IT in nursing practice has indicated that more research is needed to validate the effects of using IT applications on nursing productivity, patient outcomes and cost effectiveness. Research on the effects of using IT application in nursing education have been inconclusive in demonstrating the benefits for student learning and faculty productivity. However, the attitude of nurse educators toward the use of computers in nursing education is positive. The research design and methods of this study will follow in Chapter III.

### **Chapter III**

#### **Designs And Methods**

This chapter presents the overall research design. The study involved two different groups of participants, (1) faculty and administration, and (2) students. The development of the survey instruments, sample selection, setting and procedures for data collection will be reviewed separately under the headings of faculty and administration and students.

#### **Research Design**

Gay (1996) described descriptive statistics as “data analysis techniques enabling the researcher to meaningfully describe many scores with a small number of numerical indices” (p. 619). Descriptive statistics have been used (1) to measure the level of perceived need of faculty, administration and students for information technology in the BN (Collaborative) Program in Newfoundland and Labrador; (2) to measure and compare the views of faculty and administration and students in the BN (Collaborative) Program on the role of IT and health care nursing practice and nursing education; (3) to measure the IT learning needs of faculty and administration and students.

#### **Ethical Review Process**

The study was approved by the Ethics Review Committee (May 1997) of the Faculty of Education at Memorial University of Newfoundland (see Appendix B).

### **Survey Instrument: Faculty and Administration**

As the literature search did not provide a survey that could be adapted to this study, a structured survey for faculty and administration was developed and piloted by the researcher. The use of a survey offered the possibility of complete anonymity and absence of the researcher and diminished the possibility of bias in the responses that reflect the participants' reaction to the researcher rather than to the questions in the survey. This was essential as the researcher had been teaching in nursing education for the last twelve years in the province of Newfoundland and Labrador and had a high degree of familiarity among this small group of responding nurse educators.

The definition of information technology was included at the beginning of the survey. The Faculty and Administration Survey (see Appendix C) included questions related to demographic data and their level of perceived need for IT in the BN (Collaborative) Program. A five point Likert type scale was used to measure faculty's and administration's views on the role of IT on health care, nursing practice and nursing education. A five point Likert scale was also used to measure the faculty's and administration's learning needs and their perceived learning needs of students enrolled in the BN (Collaborative) Program for specific topics related to information technology. Three open-ended questions were included at the end of the survey to give faculty and administration an opportunity to provide additional information related to the inclusion of IT in the BN (Collaborative) Program and to ensure that the participant could address issues deemed to be important and related to IT and nursing education.

One administrator and one faculty member at two different sites of the BN (Collaborative) Program were contacted verbally by the researcher to ask their permission to participate in a pilot of the survey and both verbally agreed. An envelope was provided to both participants that included a letter which thanked them for their participation in the piloting of the survey and provided them with directions for completing the pilot (see Appendix D), a Consent to Participate Form (see Appendix E), the Faculty and Administration Survey (see Appendix C) and a Guiding Questions document for participants to complete as part of the piloting of the survey (see Appendix F). A return envelope with appropriate postage was also provided. A period of two weeks was given to both participants to complete the pilot. Results of the pilot were reviewed and final revisions included three editorial changes deemed necessary after the pilot review was completed.

#### **Survey Instrument: Students**

As the literature search did not provide a survey that could be adapted to this study, a structured student survey was also developed and piloted by the researcher. The use of a survey was essential as the researcher had taught at one site of the BN (Collaborative) Program in the 1996-1997 academic year and, therefore, was known to the students at that site. It was decided to use a facilitator to meet with students to obtain their signed Student's Consent to Participate forms and the completed Student Surveys to reduce researcher bias.

The researcher's definition of information technology was included at the beginning of the survey. The Student Survey (see Appendix G) included questions related to demographic data and the students' level of perceived need for IT in the BN (Collaborative) Program. A five point Likert type scale was used to measure students' views on the role of IT on health care, nursing practice and nursing education. A five point Likert scale was also used to measure the students' learning needs for specific topics related to IT. Two open-ended questions were included at the end of the survey to give students an opportunity to provide additional information related to IT in the BN (Collaborative) Program and to ensure that students could address issues deemed to be important related to IT in the BN (Collaborative) Program.

Three second year students (two females and one male) of the BN (Collaborative) Program were contacted by the researcher to ask their permission to participate in the piloting of the Student Survey and all verbally agreed. A nurse educator, not participating in the study, agreed to be the facilitator for the pilot of the Student Survey. Students met with the facilitator at a mutually agreed upon time to complete the piloting of the Student Survey. An envelope was provided to each of the three students which included a letter which thanked them for their participation in the piloting of the survey and provided them with directions for completing the pilot (see Appendix H), a Student Consent To Participate form (see Appendix I), the Student Survey (see Appendix G) and a Guiding Questions document (see Appendix F). A time frame of up to two hours was given to the students to complete the pilot. Students were asked not to discuss the

content of the survey with anyone until all data for the study was collected. Results of the pilot were reviewed and final revisions included two editorial changes.

#### **Sample and Selection Criteria: Faculty and Administration**

The faculty and administration sample was chosen through convenience nonprobability sampling. It included all full-time faculty and administration ( $n=20$ ) at the three sites of the BN (Collaborative) Program in Newfoundland and Labrador. The sample of faculty and administration were limited as the first academic year of the BN (Collaborative) Program was 1996-1997.

#### **Sample and Selection Criteria: Students**

The student sample was chosen using convenience nonprobability sampling. It included all full-time second year students at the three sites of the BN (Collaborative) Program in Newfoundland and Labrador. The sample was limited to the first academic year being 1996-1997. The total possible sample of full-time second year students was 198.

#### **Procedures: Faculty and Administration**

Data were collected over a two month period in the fall of 1997. A letter was sent to the Directors of Nursing at the three sites of the BN (Collaborative) Program explaining the study and asking for permission to access faculty and administration (see Appendix J). Written permission was given by two site directors (see Appendix K). The third school director conveyed in writing that she could not give her written permission to access faculty and administration as she considered it to be a personal and professional decision

by each person individually (see Appendix L). This director of nursing did contact all faculty and administration at that site to inform them of the study and conveyed to them her own personal support for the study.

A letter explaining the study and asking faculty and administration to participate in the study (see Appendix M) and Consent to Participate in Research form (see Appendix E) were sent to all full-time faculty and administration (n=20) at the three sites. The informed consent described the purpose, procedure, duration of participant involvement, potential benefits and anonymity. The consent advised the participants that participation was voluntary and they had the right to withdraw from the study at anytime and may refuse to answer any questions. A researcher addressed postage paid return envelope was included. A target date for return of signed Consent to Participate forms was three weeks. Telephone reminders were given to possible participants after the three week target date. Consent to Participate forms were signed and returned by 17 of the faculty and administration sample to the researcher for a response rate of 85%. This high response may have indicated the importance of this topic to faculty and administration working with the BN (Collaborative) Program.

The 17 participants were sent a letter thanking them for their willingness to participate (see Appendix N) and a copy of the Faculty and Administration Survey (see Appendix C) to complete within a one month time frame. A researcher addressed postage paid envelope was provided. Participants that did not return their completed surveys by the target date received two telephone reminders by the researcher. Two weeks after the

target date all completed surveys had been returned for a return rate of 100%. This high return rate is likely an indication of the interest of faculty and administration in the topic of Information Technology and the BN (Collaborative) Program. Surveys were coded numerically to ensure confidentiality.

#### **Procedures: Students**

Data were collected over a three month period in the fall of 1997. A letter was sent to the Directors of Nursing at the three sites of the BN (Collaborative) Program explaining the study and asking for permission to access their full-time second year students (see Appendix J). Written permission was given by the three site directors (see Appendix O).

To minimize the effect of researcher bias, three faculty members were randomly chosen as facilitators at each of the three sites. The facilitators were not participants in the Faculty and Administration Survey. However, one faculty member had been involved in the piloting of the Faculty and Administration Survey. Three of these faculty members verbally agreed to act as facilitators for the collection of data from second year students at their respective sites. The researcher met with each of the facilitators to discuss their role and to emphasize the importance of consistency in their role as facilitators. A Guidelines For Facilitators document (see Appendix P) was given to the three facilitators which provided clear directions in their role as facilitators. The researcher answered all questions asked by the facilitators and consistency was ensured through this approach.



Because of an excessive students' academic workload at the time of the conducting of the study, a convenient class time was chosen by the researcher in consultation with either a faculty member or an administrator at each of the three sites. It was decided to access students at the end of a required nursing course lecture slot. One week prior to the chosen class time, a faculty member at each of the respective sites informed the students of the name of the study as well as the date and time for the collection of data.

The facilitators entered each designated classrooms and read to students the document, Introduction of Research to Students provided by the researcher (see Appendix Q). The purpose of this document was to ensure consistency by the three facilitators with the collection of data. The facilitators noted the total possible number of participants at that time. For example, at one site which had 113 students enrolled in that course the facilitator noted a total of 70 students in class at the time of data collection.

Facilitators reminded students that participation was voluntary and that they may refuse to answer any questions. Students were reassured that participation or refusal to participate in this study would have no effect on their role as a student. Anonymity was assured. Students that were willing to participate were given a Student Consent to Participate form to sign (see Appendix I). The informed consent described the purpose, procedure, duration of participant involvement, potential benefits and anonymity. When the facilitator received the signed Student Consent to Participate form, the student was given the Student Survey to complete (see Appendix G). Students were given up to one

hour to complete the survey. Completed Student Survey forms were returned to the facilitator and placed in a large envelope with the signed Consent to Participate forms. All completed Student Survey forms and signed Consent to Participate forms were returned to the researcher by the facilitator in a sealed envelope provided by the researcher. The overall student response rate at the three sites was 87% which is likely to be an indication of the high interest of students on this topic.

### **Data Analysis**

The data were analyzed using the Statistical Package for Social Sciences, revised edition (SPSS Statistics for the Social Sciences, Inc., 1995). Descriptive statistics were used to describe both the faculty and administration and student sample. Demographic data of faculty and administration and students and level of perceived need for IT in the BN (Collaborative) Program were measured using frequency tabulations.

There were three sections that collected data on participants views of information technology and health care, nursing practice and nursing education. The reliability of items included in each of these three sections was assessed using Cronbach's Alpha. Gay (1996) stated "that the use of Cronbach's Alpha is to estimate internal consistency based on a determination of how all the items on a test relate to all other items and to the total test" (p. 619). This provided the researcher with a view that items included within the views of IT and health care, nursing practice and nursing education were reliable with their respective groups.

A five point Likert scale was used to measure the views of faculty and

administration and students on each of the three sections. The mean on each item was computed. Harris (1995) stated, "almost all researchers feel that it is appropriate to calculate a mean on the kind of questionnaire items that fall between ordinal and interval scales and thus use parametric procedures to analyze such data" (p. 19).

Parametric testing using ANOVA's on the individual mean for each view of information technology and health care, nursing practice and nursing education was completed. Gay (1996) described the ANOVA as, "a parametric test of significance used to determine whether there is significant difference between or among 2 or more means at a selected probability level" (p. 625). Cramer (1994) stated, "some writers have argued that parametric tests should only be applied when the data fulfill the following three conditions: (1) the variables are measured with an equal interval or ratio scale; and the samples are drawn from populations; (2) whose variances are equal or homogeneous; and (3) whose distributions are normal ... whether these conditions have to be satisfied before parametric tests can be employed has been seriously questioned" (p. 53).

Since sample size of faculty and administration and students differed, being 17 and 122 respectively, which may have represented a violation of assumption for use of parametric testing, it was decided to also conduct a Mann-Whitney test on the individual mean for each view of information technology and health care, nursing practice and nursing education. Gay (1996) stated, "nonparametrics, a test of significance appropriate when the data represents an ordinal or nominal scale, when a parametric assumption has been greatly violated or when the nature of the distribution is now known" (p. 622).

Harris (1995) stated, “parametrics are usually more powerful; meaning they are generally more likely than nonparametrics tests to identify a difference in population parameters or a relationship among variables in the population. Parametrics are also robust to violations of most of their assumptions, meaning that they are likely to give you the correct results even if the assumptions under which they were derived are not fully met” (p. 19).

Therefore, ANOVA and Mann-Whitney scores were utilized and compared to ensure accuracy of the results based on a significance level of  $p < .05$ .

### **Summary**

This chapter included the design and methods used to conduct the study. The developmental process of the survey instruments for both faculty and administration and students and the procedure and results of the piloting of the two survey instruments were reviewed. The procedure for sampling procedures is discussed. The rationale for the type of tests included in the data analysis has also been described.

## **Chapter IV**

### **Results**

The purpose of this chapter is to report the findings. Frequency and percents are used to summarize the data on demographic data of faculty and administration and students. Mean and ANOVA scores on views of information technology and health care, nursing practice and nursing education are explored, frequency and percents are further used to summarize data on faculty and administration and students' learning needs. Faculty and administration and student responses to open-ended statements are presented. Tables are included to enhance comprehension of the results.

#### **Sample Characteristics: Faculty and Administration**

The faculty and administration sample consisted of 17 females, of whom 47% were faculty and 53% administration. Twelve percent of faculty and administration were between the ages of 26-35, 30% were between the ages of 36-45 and 58% were between the ages of 46-55. Educational preparation of the sample varied with 24% of faculty and administration with a Bachelors Degree in Nursing and 76% of the faculty and administration were prepared at the Master's level or higher. Preparation at the Master level is a requirement for a faculty position in the BN (Collaborative) Program. Table 1 presents the number of years of teaching experience by faculty and administration. There were no faculty or administration with less than five years teaching experience in nursing education. Seventy-one percent of faculty and administration had greater than 16 years experience in nursing education.

**Table 1****Number of Years Working in Nursing Education by Faculty and Administration (n=17)**

<b>No. of Years</b>	<b>%</b>	<b>n</b>
Less than 5 years	0	0
6-10	23.5	4
11-15	5.9	1
16-20	23.5	4
over 20 years	47.1	8

**Computer Use**

Computer experience of greater than 2 years was reported by 95% of faculty and administration. Table 2 reports the computer experience of faculty and administration. All faculty and administration had used a computer either at home or at work. All faculty and administration had access to a computer at work while 94% had access to a computer at home. Seventy-one percent of faculty and administration used a computer for greater than 5 hours per week at work while 6% had no computer use at work. Eighty-two percent of faculty and administration used a computer for more than 2 hours per week at work.

The number of hours that faculty and administration used a computer at home also varied with 12% of faculty and administration with no computer use at home to 35% of faculty and administration with greater than 9 hours per week or more. Overall 77% of

faculty and administration had used a computer at home for more than two hours per week. Table 3 describes the computer usage at work and at home by faculty and administration.

**Table 2**

Computer Experience of Faculty and Administration (n=17)

<b>Experience</b>	<b>%</b>	<b>n</b>
0	0	0
< 6 months	0	0
6 months - 1 year	5.9	1
2 - 5 years	47.1	8
> 6 years	47.1	8

**Table 3**

Computer Use at Work and at Home by Faculty and Administration (n=17)

<b>No. of Hours</b>	<b>At Work %</b>	<b>n</b>	<b>At Home %</b>	<b>n</b>
0	5.9	1	11.8	2
0 - 1	11.8	2	11.8	2
2 - 4	11.8	2	35.3	6
5 - 8	23.5	4	5.9	1
9 or more	47.1	8	35.3	6

The type of computer applications used by faculty and administration is reported in Table 4. E-mail was used by all faculty and administration. Word processing and computerized literature searches were used by 88% of faculty and administration. The use of computer applications by faculty or administration other than e-mail, word processing and literature searches was less than 50%.

**Table 4**

Use of Computer Applications By Faculty and Administration (n=17)

<b>Computer Applications</b>	<b>%</b>	<b>n</b>
Computer Assisted Instruction	47.1	8
Spreadsheet/Database Input	47.1	8
Word Processing	88.4	15
Teleconferencing/Distance Education	11.8	2
Graphic Presentations	35.3	6
Hospital Information Systems	17.6	3
Literature Searches	88.4	15
E-mail	100	17

Faculty's and administration's clinical area of expertise indicated that clinical expertise is diverse and faculty and administration have more than one area of expertise.



Medicine was indicated by 30% of faculty and administration as their clinical area of expertise. Table 5 presents the clinical area of expertise of faculty and administration.

**Table 5**

Clinical Area of Expertise of Faculty and Administration (n=17)

Clinical Area of Expertise	%	n
Surgery	17.6	3
Medicine	29.4	5
Obstetrics	11.8	2
Psychiatry	5.9	1
Pediatrics	5.9	1
Community	11.8	2
Gerontology	11.8	2
Surgical/Medical ICU	11.8	2
Emergency	5.9	1
OR/PORR	0	0
Other - not current	5.9	1
Health Promotion	5.9	1
Administration	5.9	1

\*Faculty and Administration had more than one area of clinical expertise

Fifty-three percent of faculty and administration had completed a course on information technology. Table 6 addresses the length in hours of information technology courses completed by faculty and administration. Faculty's and administration's self-rated knowledge of IT was high, as 65% of faculty and administration rated their knowledge level at an intermediate level. Only 12% of faculty and administrators rated themselves as advanced while 24% of faculty and administration rated themselves as beginners.

#### **Sample Characteristics: Students**

The student sample consisted of 122 second year students enrolled full-time in the BN (Collaborative) Program in Newfoundland and Labrador. Eighty-eight percent of students were female and 12% were male. The ages of the students were concentrated as 93% of students were between the ages of 18-25 and 88% of these students had completed high school in the last 5 years. Eleven percent of students had completed high school within the last 6-10 years and 2% had finished high school in the last 11-15 years. Educational preparation of students indicated that 11% of students had a Bachelor's Degree.

**Table 6**

Length (hours) of Completed Information Technology Course by Faculty and Administration (n=9)

<b>Hours</b>	<b>%</b>	<b>n</b>
1 - 5	5.9	1
6 - 15	11.8	2
16 - 25	17.6	3
26 - 36	17.6	3

#### Computer Use

Computer experience of two years or more was reported by 75% of students.

Since 88% of students had finished high school in the last five years, it is likely that student's computer experience may have been gained from a post secondary institution.

Thirty-three percent of students had greater than 6 years of computer experience.

Students' self-rated level of expertise indicated that only 2% of students rated themselves at an advanced level although 33% of students had greater than 6 years of computer experience.

All students had access to a computer at school. The time frame of 1-4 hours per week comprised 80% of computer time used at school by students. While sixty-five percent of students had access to a computer at home, only 34% of students who had

access to a computer at home used a computer at home. Student computer use at school and at work is reported in Table 7.

The type of computer applications used by students is indicated in Table 8. The use of computer applications by students other than e-mail, word processing and literature searches was less than 30%. An IT course was completed by 9% of students and completion of an IT course of 16 hours or longer had been completed by 3% of students. The total length in hours of the completed information technology course by students is described in Table 9.

**Table 7**

Student Computer Use at School (n=118) and at Home (n=111)

<b>No. of Hours</b>	<b>At School %</b>	<b>n</b>	<b>At Home %</b>	<b>n</b>
0	13.1	16	33.6	41
0 - 1	41	50	24.6	30
2 - 4	39.3	48	26.2	32
5 - 8	3.3	4	6.6	8
9 or more	0	0	0	0

**Table 8**Student Use of Computer Applications (%) (n=118)

<b>Computer Applications</b>	<b>%</b>	<b>n</b>
Computer Assisted Instruction	20.5	25
Spreadsheet/Database	13.1	10
Word Processing	83.6	102
Teleconferencing/Distance Education	2.5	3
Graphic Presentations	10.7	13
Hospital Information Systems	26.2	32
Literature Searches	68.9	84
E-mail	79.5	97

**Table 9**Length (Hours) of Completed Information Technology Course(s) by Students (n=11)

<b>Hours</b>	<b>%</b>	<b>n</b>
1 - 5	3.3	4
6 - 15	.8	1
16 - 25	.8	1
26 - 36	2.5	3

\*Two students did not complete this question

### **Views of Information Technology**

The views of information technology were divided into three sections, relating respectively to health care, nursing practice, and nursing education.

#### **Views of Information Technology and Health Care**

The reliability of the eight views of information technology and health care was assessed using Cronbach's Alpha. Coefficient was (.73) and a standardized item alpha was (.75) which indicated that these eight items have internal consistency. The eight views of information technology and health care and the mean scores for faculty and administration and students in order of faculty and administration mean rank are presented in Table 10. The overall mean score for students was 16.1389 and for faculty and administration was 12.9286. It was concluded based on these results that the faculty and administration group overall had a stronger level of agreement or disagreement on the views of information technology and health care than the student group.

An Analysis of Variance (ANOVA), a parametric test, was used to draw inferences about the differences in the mean scores on the views of IT and health care by faculty and administration and students. ANOVA scores on faculty and administration and students' means on the views of IT and health care indicated a significance level of  $< .05$  on five views.

A Mann-Whitney test or the rank sum test was performed on the mean scores of both the faculty and administration and students on the views of IT and health care. This was included to ensure accuracy of the ANOVA scores as the sample size of the two

groups, faculty and administration and students were different ( $n=14$ ,  $n=108$ ). A comparison of ANOVA and Mann-Whitney scores are also reported in Table 10. Results indicated that five views of IT and health care were significant.

**Rank of views on information technology and health care.**

The eight views on information technology and health care by faculty and administration and students in order of faculty and administration mean rank are presented in Table 10.

Table 10

Eight Views of Information Technology and Health Care With Mean Scores and Comparison of ANOVA and Mann-Whitney Scores of Faculty and Administration (n=14) and Students (n=108) in Order of Faculty and Administration Mean Rank.

Views of Information Technology and Health Care	Faculty/ Administration Mean	Student Mean	ANOVA (p value)	*Mann Whitney (2-tailed p)
1. The use of Information Technology will lower the cost of health care. (1)	2.19	2.19	.9951	.9809
2. The use of Information Technology has been attributed to job loss in health care. (2)	2.07	2.17	.0019*	.0010*
3. The use of Information Technology in health care improves the quality of patient care. (3)	1.87	1.96	.6175	.6698
4. The use of Information Technology in health care represents a violation of patient privacy. (8)	1.65	2.37	.0001*	.0001*
5. The use of Information Technology in health care saves time. (6)	1.50	1.59	.5964	.4483
6. The use of Information Technology in health care improves communications. (7)	1.47	2.00	.0057*	.0045*
7. The use of Information Technology has improved the exchange of information in health care. (5)	1.35	1.66	.0455*	.0290*
8. The use of Information Technology has an important role to play in health care. (4)	1.24	1.75	.0002*	.0001*

\*p<.05.



### **Views of Information Technology and Nursing Practice**

The second group of views was related to views of IT and nursing practice. The reliability of the eight views on information technology and nursing practice was assessed using Cronbach's Alpha. Coefficient (.76) and a standardized item alpha (.77) indicated that these views have internal consistency. The eight views of information technology and nursing practice are presented in Table 11.

The mean score on the eight views on IT and nursing practice for faculty and administration and students in order of faculty and administration mean rank are presented in Table 11. The overall means for students on the views of IT and nursing practice was 15.3267 and the overall faculty and administration mean was 12.7143. It was concluded based on these results that faculty and administration overall had a stronger level of agreement or disagreement on the views of IT and nursing practice than the students.

ANOVA scores were used to draw inferences about the differences in the mean scores on the views of IT and nursing practice by faculty and administration and students. The overall ANOVA score between and within the two groups of .0022 indicated statistical significance. ANOVA scores on faculty and administration and students' means on the views of IT and nursing practice revealed a significance level of  $< .05$  on five views.

A Mann-Whitney test was performed on the mean scores of both the faculty and administration and students on the eight views of IT and nursing practice to ensure accuracy of the ANOVA scores as the sample size used in the study was different ( $n=14$ ,  $n=108$ ). A comparison of ANOVA and Mann-Whitney scores are reported in Table 11.

Both tests indicated that five of the eight views of Information Technology and Nursing Practice were significant.

Table 11

Eight Views of Information Technology and Nursing Practice With Mean Scores and Comparison of ANOVA and Mann-Whitney Scores of Faculty and Administration (n=14) and Students (n=108) in Order of Faculty and Administration Mean Rank.

Views of Information Technology and Nursing Practice	Faculty/Administration Mean	Student Mean	ANOVA (p value)	*Mann Whitney (2-tailed p)
1. Acquisition of Information Technology skills by nursing improves nurses occupational satisfaction. (12)	2.07	2.12	.7697	.3919
2. The use of Information Technology by nursing increases nurses professional status. (19)	1.94	1.93	.9721	.8727
3. Knowledge of and skill in Information Technology by nursing will allow more time for patient care. (16)	1.81	2.06	.1601	.1631
4. The use of Information Technology by nursing allows nurses an opportunity to improve patient care. (18)	1.65	1.95	.0392*	.0383*
5. The use of Information Technology by nursing will depersonalize nursing care. (15)	1.59	2.28	.0006*	.0005*
6. The use of Information Technology by nursing increases costs by increasing nurses workloads. (11)	1.56	2.09	.0015*	.0011*
7. Nurses need to have a role in the design of patient/hospital information systems. (10)	1.26	1.47	.0044*	.0029*
8. Knowledge of and skill in Information Technology can assist in preparing nurses for the 21 <sup>st</sup> century. (14)	1.18	1.48	.0199	.0204*

\*p<.05.

### **Rank of views on information technology and nursing practice.**

Table 11 presents the eight views on IT and nursing practice by faculty and administration and students in order of faculty and administration mean rank.

### **Views of Information Technology and Nursing Education**

The third group of views relate to views on information technology and nursing education. Six views were omitted from testing as they were only included in the faculty and administration survey. The analysis on these views will be discussed later. The reliability of the remaining ten views on IT and nursing education was assessed using Cronbach's Alpha. Coefficients were (.66) and a standardized item coefficient was (.70). It was decided to omit the view, the majority of students entering nursing undergraduate programs are computer literate, which had an individual coefficient of (.72). Cronbach's Alpha was rerun omitting this view and results indicated a coefficient of (.72) and the standardized item alpha of (.74). Another view, the cost of implementing IT in nursing education is too expensive for nursing, had a coefficient of (.67). Based on this score it was decided to omit this view from this group. A Cronbach's alpha was rerun omitting both views. The coefficients now indicated (.76) and the Standardized item alpha of (.78). Based on these results it was concluded that these eight views of IT and nursing education have internal consistency. The eight views of information technology and nursing education and the mean scores for faculty and administration and students in order of faculty and administration mean rank are presented in Table 12.

Table 12

Eight Views of Information Technology and Nursing Education With Mean Scores and Comparison of ANOVA and Mann-Whitney Scores of Faculty and Administration (n=14) and Students (n=108) in Order of Faculty and Administration Mean Rank.

Views of Information Technology and Nursing Education	Faculty/ Administration Mean	Student Mean	ANOVA (p value)	*Mann- Whitney (2-tailed p)
1. The BN (Collaborative) Program in Newfoundland and Labrador should offer a required course on information technology. (33)	2.71	1.88	.0001*	.0002*
2. The computer competency of nursing students should be evaluated clinically. (30)	2.47	2.54	.7353	.6843
3. The BN (Collaborative) Program in Newfoundland and Labrador should offer an elective course on information technology. (34)	2.12	1.74	.0204*	.0868
4. The need for implementation of Information Technology must be addressed in the BN (Collaborative) Program in Newfoundland and Labrador. (35)	1.75	1.75	.9894	.9938
5. Students graduating from the BN (Collaborative) Program in Newfoundland and Labrador should demonstrate competence in using patient information systems. (31)	1.56	1.83	.0861	.0880
6. The use of Information Technology in nursing education improves graduates marketability for employment. (27)	1.50	1.63	.3852	.4126
7. Knowledge of and skill in the use of Information Technology is a requirement for lifelong learning. (20)	1.29	1.84	.0019*	.0016*
8. Students graduating from the BN (Collaborative) Program in Newfoundland and Labrador should be competent with computer applications such as Internet searches, e-mail and word processing. (32)	1.24	1.76	.0011*	.0007*

\*p<.05.

The mean score on the eight views of IT and nursing education for students and faculty and administration and students are presented in Table 12. The overall mean score gathered from students on the views regarding IT and nursing education was 14. Faculty and administration mean score was 14.50. Based on these results it was concluded that faculty and administration had a stronger level of agreement or disagreement overall on the views of information technology and nursing education than students.

ANOVA scores were used to draw inferences about the differences in the mean scores on the views of IT and nursing education by faculty and administration and students. The overall ANOVA score between and within the two groups of .73 indicated no statistical significance. ANOVA scores on faculty and administration and student means on the views of IT and nursing education indicated a significance level of  $< .05$  on four of the eight views.

A Mann-Whitney test was conducted on the mean scores of both faculty and administration and students on the eight views of IT and nursing education. The Mann-Whitney test was included to ensure accuracy of the ANOVA due to the different sample size of the faculty and administration and students used in the study. Table 12 compares the ANOVA and Mann-Whitney scores. There was a discrepancy on the view. The BN (Collaborative) Program in Newfoundland and Labrador should have an elective course on IT. The ANOVA score of .02 indicated statistical significance. It was decided to accept the nonparametric test, the Mann-Whitney which had indicated no statistical significance.

### **Rank of views on information technology and nursing education.**

Table 12 presents the eight views on information technology and nursing education in order of faculty and administration mean rank.

### **Views of Information Technology and Nursing Education By Faculty and**

#### **Administration**

There were six views on IT and nursing education that were included on the Faculty and Administration Survey but omitted on the Student Survey because these views pertained to faculty and administration only. The views of information technology and nursing education with mean scores of faculty and administration are presented in Table 13.

### **Learning Needs: Faculty and Administration**

Faculty and administration were asked to rate the applicability of 17 topics to their learning needs for inclusion in faculty development sessions. The reliability of these topics was assessed using Cronbach's Alpha. Coefficients (.93) and standardized item alpha (.93) indicated that these topics have internal consistency. The mean and ranking of each topic by faculty and administration is presented in Table 14.

### **Learning Needs: Students**

The applicability of student learning needs of 11 topics related to IT were reviewed by both faculty and administration and students using a five point Likert scale. The reliability of these 11 topics was assessed using Cronbach's Alpha. Coefficients (.82) and a Standardized Item Alpha (.82) indicated that these topics have internal consistency.

**Table 13****Views of Information Technology and Nursing Education With Mean Scores of Faculty and Administration**

<b>Views of Information Technology and Nursing Education</b>	<b>Faculty/Administration Mean</b>
1. The use of Information Technology in nursing education is an added stress to faculty and administration with little benefit to students. (28)	3.67
2. The use of Information Technology by nursing faculty improves the delivery of nursing education. (21)	1.76
3. The use of Information Technology by nurse educators in teaching improves the quality of teaching methods. (25)	1.63
4. The use of Information Technology as a teaching method meets the learning styles of nursing students. (23)	1.60
5. Nurse educators need more formal educational opportunities regarding the use and application of Information Technology in teaching. (29)	1.53
6. The use of Information Technology in nursing education improves faculty productivity. (26)	1.38

\*p&lt;.05.



**Table 14****Mean and Ranking of Learning Need Topics of Faculty and Administration**

<b>Topic</b>	<b>Mean</b>
Staffing	3.09
Word Processing	2.67
Budgets	2.62
Literature Searches	2.40
Flowcharts	2.27
Spreadsheets	2.14
Decision Support	2.13
Telemedicine	2.13
Expert Decision Making	2.13
Quality Assurance	2.12
Electronic Communications	2.06
Statistical Package	2.06
Educational Tracking	2.00
Hospital Information Systems	2.00
Distance Education	2.00
Internet Resources	1.81
Computer Assisted Instruction	1.73

The mean and ranking of topics for students' learning needs by faculty and administration are presented in Table 15. Table 16 presents the mean and ranking of topics for students' learning needs by students. The overall mean for faculty and administration on these learning needs for students was 20.00 and the overall means for students on their own learning needs was 20.57.

An ANOVA score was used to draw inferences about the differences in the mean scores on the learning needs of students by faculty and administration and students. The overall ANOVA score between and within the two groups of .6517 indicated no statistical significance. ANOVA scores on five topics indicated statistical significance.

A Mann-Whitney test was performed on the means of both faculty and administration and students on the 11 topics. Again, this was included to ensure accuracy of the ANOVA scores as the sample size of the two groups differed. Table 17 compares the results of the ANOVA and Mann-Whitney scores which revealed agreement on all topics of learning needs of students.

**Table 15**

Mean and Rank of Information Technology Topics for Student's Learning by Faculty and Administration

<b>Rank of Topics</b>	<b>Mean</b>
Spreadsheets	2.85
Flowcharts	2.44
Decision Support	2.19
Statistical Package	2.06
Expert Decision Making	1.94
Electronic Communications	1.59
Hospital Information Systems	1.50
Computer Assisted Instruction	1.41
Word Processing	1.35
Internet Resources	1.18
Literature Searches	1.12

**Table 16****Mean and Rank of Information Technology Topics for Student's Learning by Students**

<b>Topic</b>	<b>Mean</b>
Spreadsheets	2.25
Expert Decision Making	2.07
Statistical Package	2.06
Decision Support	2.05
Electronic Communications	1.92
Flowcharts	1.89
Computer Assisted Instruction	1.89
Internet Resources	1.68
Word Processing	1.66
Hospital Information Systems	1.60
Literature Searches	1.58

**Table 17**

Comparison of ANOVA and Mann-Whitney Scores on Information Technology Topics for Student's Learning.

Application	ANOVA (p value)	Mann-Whitney (2-Tailed P)
Computer Assisted Instruction	.0016*	.0011*
Internet Resources	.0017*	.0009*
Flowcharts	.0022*	.0028*
Literature Searches	.0044*	.0024*
Spreadsheets	.0048*	.0073*
Electronic Communications	.0629	.0546
Word Processing	.0716	.0699
Decision Support	.4398	.5206
Expert Decision Making	.4829	.3771
Hospital Information System	.5648	.7154
Statistical Package	.9975	.8650

\* $p < .05$

### **Open-Ended Statements**

Open-ended statements were included at the end of both the Faculty and Administration Survey (see Appendix C) and the Student Survey (see Appendix G) to allow the participants an opportunity to comment on information technology and nursing.

#### **Faculty and Administration**

Faculty and administration were given the opportunity to respond to three open-ended statements that each required a short written response (see Appendix C). Responses to statements #1 and #2 were provided by 15 participants and 12 responses were provided to statements #3 (see Appendix R).

#### **Students**

Students were given the opportunity to respond to two open-ended statements that required short written responses (see Appendix G). Student responses varied, 31 students responded to statement #1 and 64 students responded to statement #2 (see Appendix S).

### **Summary**

A high level of agreement was generated between faculty and administration and students on views of information technology and health care, nursing practice and nursing education. There was statistical significance between some views of faculty and administration and students. However, the significance was revealed as agreement on the view between the two groups rather than disagreement. This agreement is likely an indication of the positive views of both groups towards IT and its role in health care, nursing practice and nursing education. Both faculty and administration and students

indicated agreement with the view, the need for the implementation of IT must be addressed in the BN (Collaborative) Program.

Faculty and administration identified and ranked their IT learning needs. Ranking was performed based on the individual mean score for each topic. Student learning needs were identified by both faculty and administration and students. Mean scores on topics for both groups were compared using ANOVA and Mann-Whitney scores which indicated statistical significance on 5 topics, computer assisted instruction, literature searches, Internet resources, spreadsheets and flowcharts. Ranking of these topics by faculty and administration and students indicated a high level of agreement between these two groups as both faculty and administration and students ranked the same learning need topics in the top five. These topics were literature searches, Internet resources, word processing, computer assisted instruction and hospital information systems.

Faculty and administration and student responses to the open-ended statements indicated a positive view of information technology and the need for knowledge and skill of information technology both as educators and as students. Chapter V will further discuss the findings presented in this chapter.

## **Chapter V**

### **Discussion**

This chapter will discuss the study's findings. Results are discussed related to demographic data and the views of faculty and administration and students on information technology and health care, nursing practice and nursing education. The learning needs of faculty and administration and students and responses to open-ended statements by both groups are discussed.

#### **Demographic Data**

Some demographic data warranted discussion. Faculty's and administration's clinical area of expertise varied and some faculty and administration had more than one area of expertise. Clinical expertise was found to be in traditional areas such as medicine, surgery, obstetrics, gerontology, community, psychiatry and pediatrics. Clinical experience in a surgical/medical intensive care unit was reported by 12% of faculty and administration. There was no clinical expertise reported in the operating room or in the post operative recovery room. Since the faculty sample was limited to those faculty who taught in the first year of the BN (Collaborative) Program it may have been expected that their clinical expertise reflect the clinical concentration in the first year which is in traditional clinical areas.

An information technology course was completed by 53% of faculty and administration and 9% of students. An information technology course of 16 hours or longer had been completed by 35% of faculty and administration and only 3% of students.



It is likely that the young age of the students may have influenced the number of students who had the opportunity to complete an information technology course as many of these students had continued from high school to university with limited time or resources for IT courses. The paucity of students who had completed an IT course may have been an indication of the need for undergraduate nursing students in the BN (Collaborative) Program in Newfoundland and Labrador to have access to IT seminars or that students should be provided with the opportunity to enroll in an elective course on IT and nursing. Findings indicated that 53% of faculty and administration had completed an information technology course, therefore, reflective of a need for faculty and administration to enroll in IT courses either through faculty development sessions or through a continuing education program.

Computer use by faculty and administration at home and at work varied; 94% of faculty and administration used a computer at work and 88% used a computer at home. Computer use by students indicated that 87% of students used a computer at school and 65% of students had access to a computer at home. However, only 34% of students who had access at home had actually used their computer at home. All faculty and administration and students in this study had access to a computer. All students had access to a computer at school. It was likely that student's computer use either at home or at school may be in relation to the amount of IT applications included in the curriculum. It was likely that as more information technology applications was implemented in the curriculum, the student's computer use might also increase.

Faculty and administration and student use of computer applications varied. The highest usage of computer applications by faculty and administration and students was word processing (88% and 84%), literature searches (88% and 69%), and e-mail (100% and 80%) respectively. The percentages for use of other computer application by faculty and administration was less than 50% and for students was less than 30%. The high percentage of use by both faculty and administration and students of computerized literature searches may be the result of the widespread availability of computerized databases for library holdings and the use of the Internet for literature searches. Although the percentage reported by both groups was high, in this era of rapid technological advancements, it may have been likely to have 100% of faculty and administration and students using computerized literature searches in an undergraduate program.

Van Dover and Boblin (1991) studied nursing students computer use in a university setting and found that 40% of students used a computer for word processing and 34% of students used a computer for literature searches. In this researcher's study, 84% of students used the computer for word processing and 69% used a computer for literature searches. The differences in the findings of Van Dover and Boblin's study and the findings of this researcher's study were likely related to the 6 year time difference between the two studies and the rapid advancements and use of information technology in health care apparent today.

Hospital Information Systems (H.I.S.) were used by 26% of students and 18% of faculty and administration. Chamber and Coates (1990) identified that a low percentage

of student computer use in the clinical area in their study was a result of the low availability of computers in the clinical area. The low usage of H.I.S. in this study by both faculty and administration and students may be reflective of the limited clinical experience and the lack of availability of H.I.S. in the student clinical placements in the first year of the program. The low use of H.I.S. by faculty and administration group overall was likely related to 53% of the faculty and administration group designated in administrative positions. The nature of an administrative position usually limits the clinical experiences thereby limiting the need to use a hospital information system.

McBride and Nagle (1996) noted that student nurses lacked experience in computer applications other than word processing, therefore "indicating a lack of understanding of the benefits and obstacles of computer use in health care" (p. 168). In this researcher's study, the findings revealed that both faculty and administration and students had minimal experiences in using computer applications which may have limited their understanding of the use of computers in health care. However, it was likely that faculty's and administration's lengthy experience in nursing would have contributed to their understanding of the obstacles and benefits of using computers in health care.

The use of spreadsheets and databases was reported by 47% of faculty and administration and by 13% of students. Use of spreadsheets and databases may be more prevalent in administrative positions than in faculty positions as a result of administrative positions having more job related tasks that require budgeting and tracking of students progress, therefore requiring knowledge of and skill in the use of spreadsheets and

databases. It may be likely that use of spreadsheets and databases by faculty would increase as more faculty research projects are conducted. The use of spreadsheets and databases by students was low and may be indicative of the lack of need by students to use spreadsheets and databases in the first year of the program. However, this should not negate their need to acquire knowledge and skill in the use of databases and spreadsheets later in their undergraduate program.

The use of computer assisted instruction by faculty and administration was 47%. It was likely that this number may be reflective of the use by faculty of C.A.I. in their classroom teaching. The amount of teaching by administrative personnel in the BN (Collaborative) Program is limited and it was therefore anticipated by the researcher that their need to use C.A.I. in their position would be lower than faculty. Computer assisted instruction was used by 21% of students. This low percentage of student use may be reflective of the limited use of C.A.I. in the BN (Collaborative) Program. The low availability and applicability of C.A.I. for nursing education and the possible lack of money in operating budgets for the purchasing of new software to aid in instruction in undergraduate nursing programs may be factors that influence the use of C.A.I. by faculty and administration.

Graphic presentations were used by 35% of faculty and administration and 11% of students. As the use of computerized technology becomes more prevalent in nursing education, it is likely that the use of graphic presentations by both faculty and administration may increase. This low usage by faculty and administration indicates the

need for professional development sessions and, thereby, providing students with the access to knowledgeable and skilled faculty and providing opportunities to use graphic presentations. Since the student population had only experiences limited to their first year of their undergraduate nursing education, the need for students to have knowledge and skill in the use of graphic presentations in the first year of the program is low. It was likely that the use of graphic presentations by students may be a necessary skill as students progress to the second, third and fourth year of the BN (Collaborative) Program.

Distance education and teleconferencing were used by 12% of faculty and administration and 3% of students. The BN (Collaborative) Program at the time of data collection for this study did not have any courses offered through distance education which may have contributed to the low usage of these computer applications by both faculty and administration and students.

Faculty's and administration's and student's self-rated level of computer expertise indicated that 12% and 2% were advanced, 65% and 53% were intermediate and 24% and 45% were at a beginners level respectively. It is likely that the required minimum knowledge level of information technology by faculty and administration working in an undergraduate program be at an intermediate level. To ensure that faculty and administration were at this level or higher, faculty development sessions or continuing education programs which focus on the learning need of faculty and administration related to information technology were required. Student's self-rated level of expertise at the intermediate (53%) and beginning (45%) level by students may be due to 43% of students

having 2-5 years of computer experience and 16% of students having 6 months to 1 year of computer experience. As 45% of students were at a beginners level, it may be an indication of the need for an introductory course on information technology to be offered to students in the first semester of the first year of the BN (Collaborative) Program.

### **Views of Information Technology and Health Care**

Analysis on the eight views of information technology and health care indicated overall that faculty and administration had stronger levels of agreement or disagreement than students. Although analysis indicated statistical significance on five views, overall the views by both groups were in agreement and reflective of their positive views of the use of IT and health care.

Both faculty and administration and students disagreed that the use of IT in health care would lower the costs of health care. This may not have reflected a negative view of IT and health care but may have indicated both groups understanding that the adoption of technology is expensive. Axford and Carter (1996) examined the views of two groups of nurses, computer users and computer nonusers. They found that in relation to cost that neither group believed that the use of a clinical information system would decrease the costs of health care. They found, however, that the nonuser group believed that health care costs would increase.

Both faculty and administration had indicated disagreement with the view that the use of information technology has been attributed to job loss. The length of experience in nursing education by faculty and administration as indicated by the demographic data, was

six years or greater. It was likely that faculty and administration had witnessed the use of information technology improving job proficiency rather than causing job loss. The disagreement by both groups to this view is likely an indication of their positive attitude towards the use of IT in health care. Bongartz (1988) studied the attitudes of computer users and nonusers towards computerizations and findings indicated that the computer nonuser group viewed the computer as more of a threat to job security. There has been much public debate over the loss of employment related to the introduction of technology in the workplace. It might therefore have been expected that views in this study would have been reflective of this concern. However, this researcher's findings indicated disagreement by both groups that the use of information technology in health care has attributed to job loss.

Faculty and administration and students agreed with the view that the use of IT in health care improves the quality of patient care. Research studies have been inconclusive on the effect of technology on improving patient care (Adderley et al. 1997; Brown et al. 1995; Lewis et al. 1992). As it was initially anticipated that this view would have had elicited more disagreement from participants, this level of agreement by both groups may be attributed to a lack of knowledge of the research on the effect of IT and the quality of patient care. The result being that participants would respond to all views positively or the belief by participants that the use of technology in the clinical area equates improvement in the quality of care.

Both faculty and administration and students agreed with the view that the use of IT has an important role to play in health care. Faculty and administration had a stronger level of agreement with this view than students. It is likely that the previous experiences of both faculty and administration and students with information technology use had influenced their agreement with this view. This level of agreement by both faculty and administration and students may have also influenced their high level of need by faculty and administration and students for IT in the BN (Collaborative) Program.

Faculty and administration and students agreed with the view that the use of IT saves time. The use of e-mail had the highest percentage of usage among faculty and administration and students. Word processing and literature searches followed. These applications provide all individuals with an advantage of saving time. It is, therefore, likely that the use of these applications by faculty and administration and students may have influenced their level of agreement with the view that the use of IT in health care saves time.

Both faculty and administration and students agreed with the view that the use of IT in health care improves the exchange of information. However, faculty and administration had a stronger level of agreement and this was statistically significant. This level of agreement by both groups is likely to have been influenced by faculty's and administration's and student's use of applications of IT. It reflected efficiency in the exchange of information such as e-mail, word processing and literature searches using the Internet.



The level of agreement with the view, that IT in health care improved communications may have been influenced by the faculty's and administration's and student's experiences with these computer applications which have the benefit of improving communications. Applications such as e-mail, word processing and literature searches and hospital information systems were featured in this context. Although the use of teleconferencing and distance education was viewed low by both faculty and administration and students, knowledge of the benefits of teleconferencing and distance education was likely to have influenced their level of agreement with the use of information technology in health care improving communications.

Faculty and administration and students disagreed with the view that the use of information technology in health care represents a violation of patient privacy. Since the issue of IT and its effect on patient privacy had been a topic of public debate, it was expected by this researcher that agreement with this view was likely. The disagreement indicated by faculty and administration was likely based upon their years of experience in health care, and they had probably witnessed the change from pen and paper activities to computerized methods and the precautions that were followed to protect patients privacy. The stronger level of disagreement by faculty and administration than students may have been indicative that faculty and administration felt confident in the technology utilized for ensuring patient privacy when using information technology in health care.

It was expected by the researcher that students' knowledge and comprehension of patient privacy issues in health care related to the use of information technology may be

somewhat limited. However, it may be likely that the use of IT in health care to these students may not have represented a violation of patient privacy, but may have represented an efficient method for the storage and retrieval of patient information. Moreover, as computerized databases and hospital information systems become essential to health care it is likely that issues such as protection of patient privacy will become resolved. The disagreement with the view by both groups that the use of IT in health care represents a violation of patient privacy may have been an indication of the positive attitudes of both faculty and administration and students towards IT and health care.

The ranking of the views of IT and health care by both faculty and administration and students evoked some common grouping. The views that reflected a positive view of information technology were ranked high and those views that reflected a negative view were ranked low. This similar ranking by both groups may have been an indication of both faculty and administration and students' positive attitude towards the use of information technology and health care.

The use of IT in health care saves time, the use of IT in health care improves the exchange of information and the use of IT in health care has an important role to play were ranked 4, 2 and 1 respectively by faculty and administration and 1, 2 and 3 respectively by students. Faculty and administration ranked the view the use of IT in health care improves communication as 3<sup>rd</sup> and students ranked it as 5<sup>th</sup>. Faculty and administration ranked the view, the use of IT in health care improves the quality of patient care as 6<sup>th</sup> and students ranked this view as 4<sup>th</sup>.

Faculty and administration ranked the view, the use of IT in health care represents a violation of patient privacy as 5<sup>th</sup> and students ranked the view as 7<sup>th</sup> which corresponded to the faculty and administration's level of disagreement being greater than students on this view. Faculty and administration ranked the view the use of IT has attributed to job loss in health care as 7<sup>th</sup> and students ranked the view as 8<sup>th</sup>. Both faculty and administration and students agreed that IT attributed to job loss, however, both ranked this view low.

### **Views of Information Technology and Nursing Practice**

The views of information technology and nursing practice by both faculty and administration and students indicated that both groups were in agreement on these views. Both groups indicated disagreement with the negative views of IT and nursing practice and agreement with the positive views of IT and nursing practice. This provided evidence for the positive views of faculty and administration and students on the views of IT and nursing practice. Overall, the faculty and administration group had a stronger level of agreement or disagreement than the student group.

There was a high level of agreement by faculty and administration and students on the view that nurses need to have a role in the designing of patient / H.I.S. For nurses to have a role in the design of this system they would need a high level of knowledge and skill of information systems. The high level of agreement by faculty and administration may have been reflective of their need to access resources that would increase their knowledge of how systems work. This is likely followed by acquiring the knowledge

required for the role of designing patient / H.I.S. The high level of agreement by students may have been reflective of their desire to have access to new knowledge on IT in their nursing program that would prepare them for more advanced roles in the area of information technology or entrance status in the profession. Hendrickson (1993) discussed the importance of having nurse engineers involved in the process of the development of information systems and how nursing involvement encouraged the development of information systems to be used by nurses as more than just a replacement of paperwork.

The view that the use of IT by nursing increases costs by increasing nursing workloads elicited disagreement by faculty and administration and students. This view had two components, increasing cost and increasing nursing workloads. It was difficult to ascertain whether the disagreement expressed by faculty and administration and students was for increasing costs or for increasing nursing workloads or both. If the disagreement was for increasing costs it is in contrast to both groups disagreement with a previous view in this study, the use of IT will lower the costs of health care. This researcher had assumed that the disagreement was with the use of IT increasing nursing workloads and that both faculty and administration and students agreed that the use of information technology by nursing would increase costs.

The experience of using computer applications such as e-mail, word processing and literature searches that can save money and reduce workload likely influenced faculty and administration and students level of disagreement with the use of IT increasing costs

and nursing workloads. Hands on experiences with a hospital information system and the knowledge of these to reduce cost and nursing workloads probably had influenced the level of disagreement elicited for this view.

Both groups were in agreement with the view that acquisition of IT skills by nursing improved nurses occupational satisfaction and the use of IT increases nurses professional status. The acquisition of IT knowledge and skill by the faculty and administration and students may have resulted in an increase in their own personal and professional satisfaction with their respective work roles. Axford and Carter (1996) in a study of nurse computer users and nonusers found that both groups believed that computers increased professional status. A feeling of satisfaction may have contributed to both groups level of agreement that acquisition of IT skills would improve nurses occupational satisfaction. An increase in self-esteem as a result of IT skills acquisition and knowledge may also have been a factor that contributed to the high level of agreement with the use of IT by nursing improves nurses' occupational satisfaction. As the profession of nursing undergoes change, nurses have been known to voice concerns with job dissatisfaction. Improvement in their occupational satisfaction through the implementation of professional development may provide opportunities for nurses to learn new IT skills which may be a useful strategy for employers to consider.

Both faculty and administration and students were in agreement with the view, knowledge of and skill in information technology can assist in preparing nurses for the 21<sup>st</sup> century. Faculty and administration had a stronger level of agreement than students. The

agreement by both groups may be an indication of the need for faculty and administration and nursing students to have the knowledge of and skill in the use of IT to ensure that they are prepared for nursing roles in the 21<sup>st</sup> century and reflective of the importance the need for IT in the BN (Collaborative) Program.

Faculty and administration and students indicated disagreement with the view that the use of IT would depersonalize nursing care may again be indicative of both groups positive view of information technology and its application to health care and nursing. With faculty's and administration's lengthy experience in nursing and their limited experiences with IT, depersonalization of nursing care did not appear to be a concern. As access to clinical experiences in the first year of the program was limited, it was expected that the students would have had a stronger level of disagreement than faculty and administration. However, this was not indicated in the findings in this researchers study. Both groups experience with computer applications such as H.I.S., was likely to have contributed to their knowledge of the benefits such as providing nurses with more time for patients care rather than depersonalizing nursing care. Adderley et al. (1997) discussed the implementation of a paperless medical record stated that "the access to the patient record through computerization has allowed more time for personalized patient care and patient and staff interaction" (p. 45).

Faculty and administration and students agreed that the knowledge of and skill in using information technology will not only allow more time for patient care but the use of information technology by nursing allows nurses an opportunity to improve patient care.

Since provision of the optimum patient care is a goal of nursing, it was considered important that both groups would be in agreement on this alleged benefit of the use of IT in nursing practice. As experiences with applications of IT was limited in both groups, it may be that their views had been formed from having the knowledge of the benefits rather than from the hands on experience.

Researchers have differed on their findings of whether nurses view the use of computers in nursing practice as allowing the nurses more time for patient care. Abbott (1993) found that student nurses generally felt that patient care would be enhanced with the continuous use of computers. However, some students questioned whether the extra time that the use of computers provided would be used by all nurses effectively. In Axford's and Carter's (1996) study they found that nurses, whether they were computer users or nonusers, did not believe that computers would increase the amount of time for patient care. However, Pabst et al. (1996) studied the effectiveness of a computerized documentation technology and found that "nurses on the automated unit increased the time spent in direct care activities" (p. 28).

The benefit of improved patient care with the use of information technology in nursing practice may be seen through the technology providing access to current databases of information to facilitate informed decision-making. McDaniels (1997) in a study to develop and evaluate a database for managing patient care information found that "nurses must have reliable, easy accessible, up to the minute data to make appropriate care decisions that lead to improved patient outcomes across the care continuum" (p. 129).

Bair, Brown, Pugh, Borucki and Spatz (1996) discussed how the use of IT allows nurses the access to current knowledge. It was through the skill in using IT that allows nurses access to current knowledge which may aid in the improvement of patient care.

The ranking of the views of IT and nursing practice by both faculty and administration and students had been reflective of both groups positive attitude towards the use of information technology and nursing practice. Both faculty and administration and students ranked the view, that nurses needed to have a role in the design of patient/H.I.S. as number one and ranked the view that knowledge of and skill in IT can assist in preparing nurses for the 21<sup>st</sup> century as number two. It was likely that the high ranking of these views by both groups have been reflective of their quest to be knowledgeable and skilled in the use of IT in nursing practice.

Faculty and administration ranked views that reflected the patient and patient care as 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup>. This may have been a result of faculty's and administration's focus on patient care as the essence of nursing practice. Faculty and administration ranked the view, the use of IT skills by nursing improves nurses occupational satisfaction and the use of IT by nursing increases nurses professional status as 7<sup>th</sup> and 8<sup>th</sup>. The ranking of these views may have been a reflection of the knowledge of and experience in nursing practice by faculty and administration and their commitment to issues related to patient care. The ranking may be suggestive that faculty and administration would prioritize issues related to patient care as more important than issues related to occupational or professional status of the nurse.



Students ranked the view, the use of IT by nursing increases nurses professional status as 3<sup>rd</sup> which may have been reflective of their need as students for professional status in the career in which they are embarking. The difference between the ranking of this view by students as 3<sup>rd</sup> and faculty and administration as 5<sup>th</sup> demonstrated the greatest differences of opinion between these two groups on the views related to IT and nursing practice.

Students ranked views that deals with patient care as 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> which is similar to the faculty's and administration's ranking. Students ranked the view, the use of information technology by nursing would depersonalize nursing care as 8<sup>th</sup> which may have been reflective of their view that the use of IT and depersonalizing patient care is not an issue.

It was concluded from the ranking of the views on information technology and nursing practice that both groups had similar patterns of agreement and of both faculty's and administration's and student's positive attitudes toward the use of IT in nursing practice.

#### **Views of Information Technology and Nursing Education**

There were eight views of information technology and nursing education. There was agreement by both faculty and administration and students on each of these views. Statistical analysis indicated significance on four views.

Both groups agreed with the view that knowledge of and skill in the use of IT is a requirement for lifelong learning. The higher level of agreement by the faculty and

administration may have been a result of their lengthy experience in nursing education and a commitment to lifelong learning. The student's level of agreement may have been an indication of their understanding that learning is lifelong and knowledge of and skill in the use of information technology is a component of life long learning.

There was agreement by both groups that the use of information technology in nursing education improves graduates marketability for employment. If students believed graduating from an undergraduate nursing program which offers a strong IT component in their curriculum as providing them with improved employment opportunities, then admission into these undergraduate programs would likely be in demand by increasing numbers of students. Doorley et al. (1994) in their rationale for including information technology in nursing education stated "after graduation these students required less orientation time to the hospital information system as new employees, thus saving time and money for the hospital. In addition, these individuals had a greater comfort level with computers and generate more careplans for their patients" (p. 162)". For faculty and administration of nursing undergraduate programs, the inclusion of IT in nursing programs may also serve as a variable for improved marketability and viability of their nursing program.

Although not statistically significant, both groups were in agreement with the view, the clinical competence of students should be evaluated clinically. The students' level of agreement on this view was the lowest level reported in this study. This low level of agreement was reflective of faculty's and administration's and students' lack of experience

with clinical applications of IT such as hospital information systems. This limited experience with H.I.S. may have been a source of fear of or intimidation by clinical evaluation of computer competence by both faculty and administration and students. A study by Sinclair and Gardner (1997) of nurse educators perceptions of IT in nursing education and found that 31% of nurse educators felt that students' computer skills should have been assessed in the clinical area which is similar to the findings in this researchers study. Sinclair and Gardner did not explore the reason for this low percentage.

Both groups were in agreement with the view that students graduating from the BN (Collaborative) Program in Newfoundland and Labrador should demonstrate competence in using H.I.S. The use of hospital information systems was low by both groups. The BN (Collaborative) Program was viewed as needing vigorous faculty development sessions on H.I.S. and to develop a curriculum that would have facilitated and ensured that graduates were competent with using hospital information systems. In their discussion of the benefits of being connected with a hospital information system, Doorley et al. (1994) stated, "the benefits of having a nursing information management system included enhanced student motivation, professional socialization, the ability to understand the whole clinical picture and decreased fear of technology" (p. 160).

Both groups were in agreement with the view that students graduating from the BN (Collaborative) Program in Newfoundland and Labrador should be competent with computer applications such as Internet searches, e-mail and word processing. This agreement by both groups may suggest that the required skills were considered essential

skills for nursing students graduating from undergraduate programs. These findings may have indicated the need for the BN (Collaborative) Program in Newfoundland and Labrador to address these skills in the first semester to provide learning opportunities to ensure competency in these skills by students graduating from their undergraduate program. To ensure competency of all faculty and administration in computer applications such as Internet searches, e-mail and word processing, faculty development sessions would also need to be provided.

There was agreement by both faculty and administration and students with the view, the BN (Collaborative) Program in Newfoundland and Labrador should offer a required course on information technology. The level of agreement by faculty and administration was the lowest level for the views of information technology in this study. Although the mean score had not indicated disagreement with this view, it had indicated that more faculty and administration were in disagreement with this view than any other view in this study. Overall, students' level of agreement was higher than the faculty's and administration's level of agreement.

Both groups were in agreement with the view that the BN (Collaborative) Program should offer an elective course on information technology. Students had a higher level of agreement than faculty and administration. Both faculty and administration and students had a higher level of agreement for an elective course than for a required course which may have been an indication that both groups supported the BN (Collaborative) Program offering an elective course on information technology.

Faculty's and administration's and students' level of agreement was identical for the view, the need for implementation of IT must be addressed in the BN (Collaborative) Program in Newfoundland and Labrador. The high level of agreement on this view may have been an indication of the quest and commitment of both faculty and administration and students with their perceived need for and implementation of information technology in the BN (Collaborative) Program. Students did, however, rank this view higher than the faculty and administration which may have been an indication that this view was considered to be of a greater need to the students.

The ranking of views by faculty and administration may have been reflective of their commitment to learning. They ranked the following views the highest: students graduating from the BN (Collaborative) Program need to be competent with computer application such as Internet searches, e-mail and word processing; knowledge of and skill in the use of information technology is a requirement for lifelong learning; the use of information technology in nursing education improves graduates marketability for employment, and students graduating from the BN (Collaborative) Program should demonstrate competence in using patient information systems. Faculty's and administration's ranking indicated their cautious view of the development of an elective or required course on IT in the BN (Collaborative) Program and their possible intimidation of evaluating student's computer competence clinically which may have been a result of limited experiences with H.I.S.

Students' ranking of views of information technology and nursing education may have been suggestive of their own needs as nursing students. Views that were ranked highest by students were those that have a direct impact on them as nursing students. The views that were ranked the highest were, the use of information technology in nursing education improves graduates marketability for employment, the BN (Collaborative) Program should offer an elective course on information technology, the need for implementation of IT must be addressed in the BN (Collaborative) Program in Newfoundland and Labrador and the view that students graduating from the BN (Collaborative) Program need to be competent with computer applications such as Internet searches, e-mail and word processing. Student's ranking may have been suggestive that they may also be intimidated with computer competence being evaluated clinically which may have been in direct relationship to their limited experiences with hospital information systems.

**Views of Information Technology and Nursing Education  
by Faculty and Administration**

Based on the responses by faculty and administration on these views, it was concluded that faculty and administration had revealed a positive attitude towards the use of information technology and nursing education. The view that was negative in context, the use of IT in nursing education was considered an added stress to faculty and administration with little benefit to students, indicated disagreement by faculty and administration. The view that was positive in context, the use of IT as teaching method met the learning styles of nursing students, evoked some disagreement. There has been much debate in education on how applications of IT can meet the learning styles of students, therefore, it was anticipated by this researcher that there would have been more disagreement by faculty and administration on this view.

**Learning Needs: Faculty and Administration**

Faculty's and administration's ranking of learning needs indicated their need to be knowledgeable and skilled in computer assisted instruction, Internet resources, distance education, hospital information systems, educational tracking, statistical packages and electronic communications. Electronic communications had been used by all faculty and administration (100%). However, it was ranked as 4<sup>th</sup> which may be suggestive that faculty and administration require more knowledge in the use of electronic communications. Although basic skills such as word processing and literature searches

were ranked low, both knowledge and skill in these applications may still be a learning need for some faculty and administration.

Faculty and administration ranked the higher skilled applications such as expert decision making, decision support and quality assurance low which is likely an indication of faculty's and administration's realistic view of their learning needs. These applications would require an advanced level of competence and data had indicated that only 12% of faculty and administration had rated themselves as advanced.

### **Learning Needs: Students**

Faculty and administration and students ranked the same five topics for students' learning needs as the most important. These topics were literature searches, Internet resources, word processing, computer assisted instruction, and hospital information systems. Complex applications such as flowcharts, spreadsheets, decision support, statistical packages and expert decision making were ranked lower. Both groups ranked literature searches 1<sup>st</sup> and spreadsheets last. Electronic communication was ranked 6<sup>th</sup> by faculty and administration and 8<sup>th</sup> by students. The low ranking of electronic communication may have been reflective of faculty's and administration's and students' belief that students have electronic communications mastered. Previous data in this study indicated that 80% of the students used e-mail, however, the complexity of e-mail use was not explored. Although electronic communications was not ranked high by faculty and administration and students, it may have been likely that electronic communications may be a learning need for some students.



The close ranking of student learning needs by faculty and administration and students may have been indicative of the knowledge level of both of these groups on the need for IT in undergraduate programs. These two groups, faculty and administration and students were so different with respect to age, educational preparation and experience and computer use, it was curious that both groups ranked the learning needs of students in the BN (Collaborative) Program so closely. The ranking by both groups may have been an indication of their awareness and knowledge of the needs of the students to be skilled and knowledgeable in the use of information technology.

The ranking of learning topics by faculty and administration and students was suggestive that they need to learn more about all the applications. This enthusiasm for learning was likely an indication of their quest for knowledge and skill. The positive responses may have been an indication that both groups limited exposure to many of the applications have made it difficult to discriminate among the group of learning topics in the survey.

The identification and ranking of the learning needs by both groups may be used by the BN (Collaborative) Program to direct curriculum changes for the content and the sequencing of course material. Carter and Axford (1993) studied the computer learning needs of practicing nurses and stated, "the study supports the notion that expert opinion should be sought in determining appropriate content for computer curricula. However, it was the inclusion of novice opinion that helps to direct the priorities for topic presentation" (p. 125).

### **Open-Ended Statements: Faculty and Administration**

The Faculty and Administration Survey presented three open-ended statements. The first was: "In your opinion, what are students' learning needs related to the inclusion of IT in the BN (Collaborative) Program?" The responses by faculty and administration to statement #1 were reflective of these students' needs that were identified by faculty and administration earlier in this study. These included computer applications such as word processing, computer assisted instruction, hospital information systems, literature and Internet searches. Overall the written responses of faculty and administration highlighted the importance of students having the skill and knowledge to access information. The consistency demonstrated by faculty and administration of the identification of these students needs was likely an indication of their commitment to these learning needs being included in the undergraduate curriculum.

The second open-ended question was: "In your opinion, what are faculty's and administration's most important needs related to the inclusion of IT in the BN (Collaborative) Program?" Faculty and administration responses to this statement #2 highlighted the faculty's and administration's learning needs they identified earlier in this chapter. The need for faculty to have the skill and knowledge to use computer assisted instruction was noted by nine participants which may have been a strong indication of the need of faculty and administration to have sessions on this method of instruction. Faculty and administration had identified and ranked C.A.I. as their most important learning need.

Other computer applications that were frequently addressed in the responses of faculty and administration in statement #2 was the need of faculty and administration to learn basic skills such as word processing, literature searches, use of the Internet, e-mail and hospital information systems. Although only one respondent stated the need for professional development, the need of faculty and administration to have access to knowledge and skill on the computer applications would likely be accomplished through faculty / professional development sessions.

The third item was a statement which read: "Please write any comments that you feel are important related to the inclusion of IT in the BN (Collaborative) Program". Faculty and administration responses to statement #3 indicated that faculty and administration are positive towards the use of IT in the BN (Collaborative) Program. Four participants indicated that IT should be a curriculum thread rather than a single course while two participants felt that an elective course should be developed. One respondent indicated that an important factor in the process of implementing IT into the BN (Collaborative) Program is the need for greater financial and human resources to ensure the competencies of faculty and students.

Overall, the responses by faculty and administration indicated their commitment to their learning needs and the learning needs of students. The positive responses of faculty and administration to these questions was comparable to the positive attitude and responses to questions and views contained in the Faculty and Administration Survey.

### **Open-Ended Statements: Students**

The Student Survey consisted of two open-ended statements. The first question was: "In your opinion, what are students most important needs related to the inclusion of IT in the BN (Collaborative) Program?" The students' responses indicated consistency in the identification of their learning needs and their positive attitude towards IT. There was one negative student comment, "I do not think it is necessary", from a total of 91 student responses which is likely an indication of the positive attitudes of this group of nursing students of the need for inclusion of IT in the BN (Collaborative) Program. Students indicated their learning needs related to basic information technology skills such as word processing, literature searches, skills in using the Internet, computer assisted instruction and hospital information systems. The need for proper instruction in learning to use IT was indicated by seven students.

The term "computer literate" was used by six students in reference to their needs. Although computer literate or literacy is used frequently in nursing literature, this researcher had avoided the term "Computer Literate" in the Student Survey because of the many definitions found in the literature which would likely cause confusion for the participants. However, the use of this item by six students is likely an indication of their need to be competent in the use of IT applications. The need for a basic computer course was addressed as a need by six students.

The second item read: "Please write any comments that you feel are important to the inclusion of IT in the BN (Collaborative) Program". Students' responses to the

second statement indicated the positive view of students for the inclusion of IT in the BN (Collaborative) Program. There were two negative student comments in the 58 responses to this statement. The need for an elective course was addressed by seven students while two students thought there should be a required course. Five students suggested that a computer course should be offered in the first semester of the BN (Collaborative) Program. The remainder of the comments referred generally to the inclusion of IT in the BN (Collaborative) Program as a benefit to the students enrolled in this program.

### Summary

This chapter has discussed the findings of the study and their relationship to other research. The findings suggested that both faculty and administration and students had a high level of perceived need for information technology in the BN (Collaborative) Program as both groups indicated agreement with the view, the need for implementation of IT must be addressed in the BN (Collaborative) Program in Newfoundland and Labrador. Computer use by faculty and administration and students was generally limited to basic application such as word processing, literature searches and electronic communications. Findings indicated that both faculty and administration and students had a positive view of information technology and health care, nursing practice and nursing education.

The rank of faculty's and administration's learning needs indicated computer assisted instruction, Internet resources, distance education, hospital information systems and educational tracking as their most important learning needs. Both groups ranked the

same five topics for student learning needs in the top five, literature searches, Internet resources, word processing, computer assisted instruction and hospital information systems. Responses to open-ended questions indicated a positive view of both faculty and administration and students for the inclusion of information technology in the BN (Collaborative) Program. As a researcher and a nurse educator, the positive views and high level of perceived need for IT in the BN (Collaborative) Program expressed by both groups was encouraging. However, this positive nature may be the result of “social desirability” by the participants. Chapter VI will summarize the findings, address the implications for nursing education and research and present conclusions.

## **Chapter VI**

### **Implications and Conclusions**

This chapter presents the conclusions and recommendations for the BN (Collaborative) Program in Newfoundland and Labrador. Implications for nursing research are discussed.

#### **Conclusion**

The purpose of this research was (1) to measure and explore the relationship between two variables, nursing students' level of perceived need for IT in their undergraduate program and the nursing undergraduate faculty's and administration's level of perceived need for information technology in the BN (Collaborative) Program; (2) to measure and compare the views of faculty and administration and students in the BN (Collaborative) Program on the role of information technology and health care, nursing practice and nursing education; (3) to measure the information technology learning needs of faculty and administration; and (4) to measure the information technology learning needs of students by faculty and administration and students.

The findings of this research indicated that both faculty and administration and students had a high level of perceived need for the inclusion of information technology in the BN (Collaborative) Program curriculum. This research study measured and compared the views of both faculty and administration and students towards the use of information technology and health care, nursing practice and nursing education. Views by both groups were positive. The information technology learning needs of faculty and administration

and students were revealed. Data indicated the thirst of faculty and administration and students to acquire knowledge and skill in the use of IT. This information may be used by the BN (Collaborative) Program in Newfoundland and Labrador to guide the implementation of information technology in the program that may meet the needs of both faculty and administration and students.

### **Recommendations for the BN (Collaborative) Program**

The recommendations are based on the findings of this research.

- Establish an "Information Technology Committee" that would guide the BN (Collaborative) Program's changes in curriculum related to information technology. This committee would have representation from faculty, administration, students, learning resource personnel and an external "IT Expert". Members should be knowledgeable and skilled in the use of information technology in nursing education and health care.
- Implement information technology as a curriculum thread in all classroom and clinical courses.
- Use the students' IT learning needs identified by faculty and administration and students to guide the curriculum changes.
- Develop an introductory course that would be offered in the first semester of first year that addresses basic skills and introduces issues of using technology in nursing and health care.
- Develop an elective course "Information Technology and Nursing".



- Evaluate the information technology learning needs of faculty, administration and students yearly to ensure that strategies that are implemented to provide learning opportunities that are current.
- Develop and implement faculty development seminars that address the IT learning needs of faculty and administration.
- Faculty and administration should be supported by the BN (Collaborative) Program to complete external information technology courses.

#### **Nursing Research**

- Research on the identification of faculty and administration and students' IT learning needs in undergraduate programs that would guide curriculum changes.
- Research on the effects of implementing information technology in undergraduate programs on students' learning and on faculty and administration occupational and professional satisfaction.
- Research on the effects of implementing information technology on the marketability of students for employment upon graduation and on the demand for admission by students to the undergraduate program.
- Research on the effects of using applications of information technology as a teaching method (C.A.I.) on students' learning.
- Research to validate the effects of using information technology applications on patient outcomes, nurses productivity and cost effectiveness.

A large portion of nursing research on information technology has dealt with the attitudes of nurses and nursing students towards computer use. Although this research has been valuable, it is time for nursing researchers and educators to evaluate the effects of using technology on student learning and on patient care. The findings of this study have indicated that the BN (Collaborative) Program in Newfoundland and Labrador must embrace technology and develop a curriculum that is grounded in providing students with the knowledge of and skill in the use of information technology in health care that will prepare them for nursing in the 21<sup>st</sup> century.

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**Appendix A**  
**Competencies for Beginning Practicing Nurses**

## Standard 13

### Professional Responsibilities

#### *THE REGISTERED NURSE HAS TO FULFILL PROFESSIONAL RESPONSIBILITIES IN HER/HIS INDEPENDENT, INTERDEPENDENT, AND ADVOCACY ROLES*

The minimum competency for the beginning practitioner:

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- |       |  |
|-------|--|
| 13.01 | Functions within the legislation and established policies related to the individual's rights and the RN's obligations, such as: <ul style="list-style-type: none"><li>(a) (Newfoundland) Registered Nurses Act, RSN R-9,1990 and By laws (1993);</li><li>(b) ARNN, Quality of Nursing Care Standards (1984) including Standards of Nursing Care for the Aged (1986);</li><li>(c) ARNN, Advanced Nursing and Medical Nursing Shared Skills (1993) and;</li><li>(d) CNA, Code of Ethics for Nurses (1991).</li><li>(e) the implications of the Canadian Charter of Human Rights and Freedoms;</li><li>(f) agency policies and procedures;</li><li>(g) identification of individuals;</li><li>(h) obtaining consents for nursing care;</li><li>(i) the maintenance of health records;</li><li>(j) use of narcotic and controlled medications;</li><li>(k) reporting of incidents;</li><li>(l) implications of the Mental Health Act;</li><li>(m) implications of the Child Welfare Act and Neglected Adults Act; and</li><li>(n) Emergency Medical Aid Act.</li></ul> |
|-------|--|
- 
- |       |  |
|-------|--|
| 13.02 | Uses means to protect the individual's and family's rights with respect to: <ul style="list-style-type: none"><li>(a) confidentiality;</li><li>(b) privacy and dignity;</li><li>(c) beliefs and values;</li><li>(d) participation in decisions affecting his/her care;</li><li>(e) access to information; and</li><li>(f) informed and voluntary consent to or withdrawal of consent to, care, treatment, and participation in research.</li></ul> |
|-------|--|
- 
- |       |  |
|-------|--|
| 13.03 | Exercises individual judgement in the performance of medically prescribed regimes and questions any member of the health team when necessary, regarding a particular aspect of the plan of care. |
|-------|--|
- 
- |       |   |
|-------|---|
| 13.04 | Exercises individual judgement in the performance of agency policies, procedures and job responsibilities and questions the appropriate person when considered inappropriate. |
|-------|---|
- 
- |       |                                 |
|-------|---------------------------------|
| 13.05 | Is accountable for own actions. |
|-------|---------------------------------|
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13.06	Demonstrates ability to evaluate own competence.
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13.07	Refrains from practising beyond her/his competence.
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13.08	Reports incidents of unsafe nursing practice to the appropriate authority (eg. dishonesty, incompetency, habit or illness rendering a person (RN) unfit to care for individuals, conduct that does not conform to the standards of the profession, and conduct that is unbecoming of a nurse as defined in the "ARNN, Guidelines for a Hearing by the Discipline Committee of ARNN...")
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13.09	Reports unsafe practices of other members of the health team to the appropriate persons.
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13.10	Participates in maintaining and improving the quality of health care: (a) shares nursing knowledge with others; (b) promotes improvements in policies and procedures related to nursing care; (c) initiates mechanisms for resolving concerns and conflicts related to quality of care and/or nursing practice.
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13.11	Actively seeks opportunities for professional development.
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## **Appendix B**

### **Approval Ethics Review Committee**



# Memorial

University of Newfoundland

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 C**  
**Faculty and Administration Survey**

### **Survey: Faculty and Administration**

I.D. Number \_\_\_\_\_

The following statements describe some aspects of information technology and its application to nursing.

**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 web access for information, the use of information systems, e-mail and computer assisted instruction (tutorial, simulation, and drill and practice).

**Please answer the following 17 questions related to demographics and computer use.**

1. Do you currently use a computer?  
☐ yes ☐ no
2. Where do you use a computer?  
☐ At home ☐ I do not use a computer  
☐ At work
3. Do you own or have access to a computer at home?  
☐ Yes ☐ No
4. Do you have access to a computer at work?  
☐ Yes ☐ No
5. How long have you used a computer?  
☐ never ☐ 2 to 5 years  
☐ < 6 months ☐ more than 6 years  
☐ 6 months to 1 year
6. How many hours per week do you use a computer at home?  
☐ 0 hours ☐ 5-8 hours  
☐ 0-1 hours ☐ 9 or more  
☐ 2-4 hours
7. How many hours per week do you use a computer at work?  
☐ 0 hours ☐ 5-8 hours  
☐ 0-1 hours ☐ 9 or more  
☐ 2-4 hours
8. In your teaching or administrative role, please ☒ the computer applications that you use?  
☐ Computer Assisted Instruction ☐ Graphic Presentations  
☐ Spreadsheet/Database Data Input ☐ Hospital Information Systems  
☐ Word Processing ☐ Literature Searches  
☐ Teleconference/Distance Education ☐ Electronic Mail

9. Have you completed a course in information technology?  
\_\_\_\_ Yes \_\_\_\_\_ No, go to question 11
10. If yes, how many hours was the information technology course?  
\_\_\_\_ 1-5 hours \_\_\_\_\_ 16-25 hours  
\_\_\_\_ 6-15 hours \_\_\_\_\_ 26-36 hours
11. How would you rate your level of expertise in using a computer?  
\_\_\_\_ Beginner \_\_\_\_\_ Advanced  
\_\_\_\_ Intermediate \_\_\_\_\_ Never used a computer
12. What is your age?  
\_\_\_\_ 18-25 years \_\_\_\_\_ 46-55 years  
\_\_\_\_ 26-35 years \_\_\_\_\_ over 55  
\_\_\_\_ 36-45 years
13. What is your sex?  
\_\_\_\_ male \_\_\_\_\_ female
14. What is the highest degree you hold?  
\_\_\_\_ Diploma in nursing \_\_\_\_\_ Master's Degree in Education  
\_\_\_\_ Bachelor's Degree in Nursing \_\_\_\_\_ Doctorate Degree  
\_\_\_\_ Master's Degree in Nursing
15. What is your job classification?  
\_\_\_\_ Faculty \_\_\_\_\_ Administration
16. What is your clinical area of expertise?  
\_\_\_\_ surgery \_\_\_\_\_ surgical / medical intensive care  
\_\_\_\_ medicine \_\_\_\_\_ coronary intensive care  
\_\_\_\_ obstetrics \_\_\_\_\_ emergency  
\_\_\_\_ psychiatry \_\_\_\_\_ operating / recovery room  
\_\_\_\_ pediatrics  
\_\_\_\_ community  
\_\_\_\_ gerontology  
\_\_\_\_ other, please specify \_\_\_\_\_
17. How many years have you taught nursing?  
\_\_\_\_ less than 5 years \_\_\_\_\_ 16-20 years  
\_\_\_\_ 6-10 years \_\_\_\_\_ over 20 years  
\_\_\_\_ 11-15 years

After reading each of the 52 statements circle the number that best expresses your view.

1 - stronger agree

3 - disagree

NA - not applicable

2 - agree

4 - strongly disagree

- |  |            |
|--|------------|
| 1. The use of Information Technology will lower the cost of health care.                               | 1 2 3 4 NA |
| 2. The use of Information Technology has been attributed to job loss in health care.                   | 1 2 3 4 NA |
| 3. The use of Information Technology in health care improves the quality of patient care.              | 1 2 3 4 NA |
| 4. The use of Information Technology has an important role to play in health care.                     | 1 2 3 4 NA |
| 5. The use of Information Technology has improved the exchange of information in health care.          | 1 2 3 4 NA |
| 6. The use of Information Technology in health care saves time.  | 1 2 3 4 NA |
| 7. The use of Information Technology in health care improves communications.                           | 1 2 3 4 NA |
| 8. The use of Information Technology in health care represents a violation of patient privacy.         | 1 2 3 4 NA |
| 9. The use of Information Technology and its application to nursing makes you uncomfortable.           | 1 2 3 4 NA |
| 10. Nurses need to have a role in the designing of patient/hospital information systems.               | 1 2 3 4 NA |
| 11. The use of Information Technology by nursing increases costs by increasing nurses workloads.       | 1 2 3 4 NA |
| 12. The use of Information Technology has reduced the amount of paperwork completed by nurses.         | 1 2 3 4 NA |
| 13. Acquisition of Information Technology skills improves nursing occupational satisfaction.           | 1 2 3 4 NA |
| 14. Knowledge and skill of Information Technology can assist in preparing nurses for the 21st century. | 1 2 3 4 NA |
| 15. The use of Information Technology will depersonalize nursing care.                                 | 1 2 3 4 NA |

16. Knowledge and skill of Information Technology by nurses will allow more time for patient care.	1	2	3	4	NA
17. The use of Information Technology allows nurses an opportunity to improve patient care.	1	2	3	4	NA
18. The use of Information Technology by nurses takes time away from direct patient care.	1	2	3	4	NA
19. The use of Information Technology by nurses increases nursing's professional status.	1	2	3	4	NA
20. Knowledge of and skill in the use of Information Technology is a requirement for lifelong learning.	1	2	3	4	NA
21. The use of Information Technology by faculty improves the delivery of nursing education.	1	2	3	4	NA
22. The cost of implementing Information Technology in nursing education is too expensive for nursing.	1	2	3	4	NA
23. The use of Information Technology as a teaching method meets the learning styles of students.	1	2	3	4	NA
24. The majority of students entering nursing undergraduate programs are computer literate.	1	2	3	4	NA
25. The use of Information Technology by nurse educators improves the quality of traditional teaching methods.	1	2	3	4	NA
26. The use of Information Technology in nursing education improves faculty productivity.	1	2	3	4	NA
27. The use of Information Technology in nursing education improves graduates marketability for employment.	1	2	3	4	NA
28. The use of Information Technology in nursing education is an added stress to faculty and administration with little benefit to students.	1	2	3	4	NA
29. Nurse educators need more formal educational opportunities regarding the use and application of Information Technology in teaching.	1	2	3	4	NA
30. The computer competency of nursing students should be evaluated clinically.	1	2	3	4	NA

- |   |            |
|---|------------|
| 31. Students graduating from the BN (Collaborative) Program in Newfoundland and Labrador should demonstrate competence in using patient information systems.                                  | 1 2 3 4 NA |
| 32. Students graduating from the BN (Collaborative) Program in Newfoundland and Labrador should be competent with computer applications such as internet searches, email and word processing. | 1 2 3 4 NA |
| 33. The BN (Collaborative) Program in Newfoundland and Labrador should offer a required course on Information Technology.   | 1 2 3 4 NA |
| 34. The need for implementation of Information Technology must be addressed in the BN(Collaborative ) program in Newfoundland and Labrador.   | 1 2 3 4 NA |
| 35. The BN (Collaborative) Program in Newfoundland and Labrador should offer an elective course on Information Technology.  | 1 2 3 4 NA |

**Using the following scale please rate the applicability of the following topics to your need for inclusion in faculty development sessions.**

**1 - strongly agree**

**3 - disagree**

**NA - not applicable**

**2 - agree**

**4 - strongly disagree**

- |                                   |            |
|-----------------------------------|------------|
| 36. Word processing               | 1 2 3 4 NA |
| 37. Computer Assisted Instruction | 1 2 3 4 NA |
| 38. Literature searches           | 1 2 3 4 NA |
| 39. Internet resources            | 1 2 3 4 NA |
| 40. Spreadsheets                  | 1 2 3 4 NA |
| 41. Budgets                       | 1 2 3 4 NA |
| 42. Quality assurance             | 1 2 3 4 NA |
| 43. Staffing                      | 1 2 3 4 NA |
| 44. Flowcharts                    | 1 2 3 4 NA |
| 45. Decision support              | 1 2 3 4 NA |



46. Electronic communications	1	2	3	4	NA
47. Expert decision making	1	2	3	4	NA
48. Hospital information systems	1	2	3	4	NA
49. Distance education	1	2	3	4	NA
50. Telemedicine	1	2	3	4	NA
51. Educational tracking	1	2	3	4	NA
52. Other	1	2	3	4	NA

**The remaining three questions are open-ended which require written responses. You may write on the back of the page if necessary.**

53. In your opinion what are students most important needs related to the inclusion of Information Technology in the BN(Collaborative) Program?

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54. In your opinion what are faculty's/ administration's most important needs related to the inclusion of information technology in the BN(Collaborative) Program?

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55. Please write any comments that you feel are important related to the inclusion of Information Technology in the BN(Collaborative) Program.

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**Thank you for your time and interest in completing this survey.**

## **Appendix D**

### **Letter for Pilot Participants - Faculty and Administration**

September 16,1997

Dear,

Thank you for agreeing to participate in the piloting of this quantitative survey of faculty and administration in the BN(Collaborative) Program. The answers you provide to the questions in the survey will be included in the study's collection of data and subsequent analysis. Guidelines are attached at the end of the survey to assist you in evaluating the survey.

When you complete the survey and feedback, please place both documents in the self-addressed envelope provided and return to me as soon as possible. I would like to receive your survey and feedback by Thursday, September 25,1997. If you have any questions please call me at 754-8932 or email [kakenned@nurse.nf.ca](mailto:kakenned@nurse.nf.ca).

Yours very truly,

Karen Kennedy

## **Appendix E**

### **Consent to Participate - Faculty and Administration**

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:** Karen Kennedy 754 -8932

**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 demonstrate quantitatively the students', faculties' and administrations' needs for information technology in the BN(Collaborative) Program. 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:** A structured questionnaire developed by the researcher will be used to gather data from students, faculty and administration. The use of a questionnaire will offer complete anonymity. All information is confidential. The questionnaire will consist of questions related to demographic data addressing age, sex, educational preparation, clinical preparation, clinical area of expertise and a five item Likert-type scale will be used for questions related to frequency of computer use at home and at work, program uses at work, completion of information technology courses and the need for information technology in the BN (Collaborative) Program. Analysis will involve descriptive correlational statistics and cross tabulation with chi - square statistics to compare students, faculty and administrations responses

**Duration of Participant Involvement:** A contact person at each of the three sites will act as a facilitator in the distribution and collection of students questionnaires. Questionnaires can be completed in approximately 45 minutes. Questionnaires will be distributed to faculty and administration by mail for completion within one month. Completed questionnaires by faculty and administration will be returned to the researcher in a self addressed, postage paid envelope as provided by the researcher Your participation is

voluntary and you have the right to withdraw from the study anytime or refuse to answer any questions

**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 in BN (Collaborative) Program. The results of the research are available if desired.

**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 on 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**

### **Pilot Guiding Questions - Faculty, Administration and Students**

**After you complete the survey, please review the applicability of the following items to the survey.**

**1. Clarity**

- Are the directions and questions clear?
- Are the sentences of sufficient length?
- Are technical terms clear?

**2. Wording**

- Are appropriate words and language used throughout?
- Is the sequencing of questions logical?

**3. Timeframe**

- Is thirty to forty minutes an adequate timeframe to complete the survey?
- Are there too many questions?
- Which, if any question(s) would you suggest to omit?



You may add any comments that you feel would add to the successful administration of this survey. Please accept my thanks for your participation in this study

Sincerely,

Karen Kennedy

**Appendix G**  
**Student Survey**

To: Students of the BN (Collaborative) Program

Thank you for agreeing to participate in the research study, "A Two Part Study to Determine the Nature of and Need for Information Technology in the BN (Collaborative) Program in Newfoundland and Labrador".

This survey addresses your computer use and views about information technology and its application to nursing. I appreciate your time and effort in completing the questionnaire

Looking forward to your valuable responses,

Karen Kennedy

## Survey: Students

**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 web access for information, the use of information systems, email and computer assisted instruction (tutorial, simulation, and drill and practice).

Please answer the following 15 questions related to demographics and computer use.

1. Do you currently use a computer?  
☐ Yes ☐ No, please go to question #11.
2. How long have you used a computer?  
☐ Never ☐ 2 to 5 years  
☐ < 6 months ☐ More than 6 years  
☐ 6 months to 1 year
3. Where do you use a computer?  
☐ At home  
☐ At school  
☐ I do not use a computer  
☐ Other, please specify \_\_\_\_\_
4. Do you own or have access to a computer at home?  
☐ Yes ☐ No
5. Do you have access to a computer at school?  
☐ Yes ☐ No
6. How many hours per week do you use a computer at home?  
☐ 0 hours ☐ 5-8 hours  
☐ 0-1 hours ☐ 9 or more  
☐ 2-4 hours
7. How many hours per week do you use a computer at school?  
☐ 0 hours ☐ 5-8 hours  
☐ 0-1 hours ☐ 9 or more  
☐ 2-4 hours
8. In your role as a student, please ☒ the computer applications that you use?  

<input type="checkbox"/> Computer Assisted Instruction	<input type="checkbox"/> Graphic Presentations
<input type="checkbox"/> Spreadsheet/Database Data Input	<input type="checkbox"/> Hospital Information Systems
<input type="checkbox"/> Word Processing	<input type="checkbox"/> Literature Searches
<input type="checkbox"/> Teleconference/Distance Education	<input type="checkbox"/> Electronic Mail

9. Have you completed a course in information technology?  
☐ Yes ☐ No, please go to question 11
10. How many hours was the information technology course?  
☐ 1-5 hours ☐ 16-25 hours  
☐ 6-15 hours ☐ 26-36 hours
11. How would you rate your level of expertise in using a computer?  
☐ Beginner ☐ Advanced  
☐ Intermediate ☐ Never used a computer
12. What is your age?  
☐ 18-25 years ☐ 46- 55 years  
☐ 26-35 years ☐ over 55  
☐ 36-45 years
13. What is your sex?  
☐ Male ☐ Female
14. What is your highest educational preparation?  
☐ Grade 11  
☐ Grade 12  
☐ Bachelor's Degree  
☐ other, please specify \_\_\_\_\_
15. How many years since you completed high school?  
☐ Less than 5 years  
☐ 6-10 years  
☐ 11-15 years  
☐ Greater than 16 years

After reading each of the 29 statements circle the number that best expresses your view.

1 - strongly agree

3 - disagree

NA - not applicable

2 - agree

4 - strongly disagree

- |   |            |
|---|------------|
| 1. The use of Information Technology will lower the cost of health care.                  | 1 2 3 4 NA |
| 2. The use of Information Technology has been attributed to job loss in health care.      | 1 2 3 4 NA |
| 3. The use of Information Technology in health care improves the quality of patient care. | 1 2 3 4 NA |
| 4. The use of Information Technology has an important role to play in health care.        | 1 2 3 4 NA |

	<b>1 - strongly agree 2 - agree</b>	<b>3 - disagree 4 - strongly disagree</b>	<b>NA - not applicable</b>
5	The use of Information Technology has improved the exchange of information in health care.		1 2 3 4 NA
6	The use of Information Technology in health care saves time.		1 2 3 4 NA
7	The use of Information Technology in health care improves communications.		1 2 3 4 NA
8	The use of Information Technology in health care represents a violation of patient privacy.		1 2 3 4 NA
9	Nurses need to have a role in the designing of patient/hospital information systems.		1 2 3 4 NA
10	The use of Information Technology by nursing increases nurses workloads.		1 2 3 4 NA
11	The use of Information Technology skills improves nursing occupational satisfaction.		1 2 3 4 NA
12	Knowledge and skill of Information Technology can assist in preparing nurses for the 21st century.		1 2 3 4 NA
13	The use of Information Technology will depersonalize nursing care.		1 2 3 4 NA
14	Knowledge and skill of Information Technology by nurses will allow more time for patient care.		1 2 3 4 NA
15	The use of Information Technology allows nurses an opportunity to improve patient care.		1 2 3 4 NA
16	The use of Information Technology by nurses takes time away from direct patient care.		1 2 3 4 NA
17	The use of Information Technology by nurses increases nursing's professional status.		1 2 3 4 NA
18	Knowledge of and skill in the use of Information Technology is a requirement for lifelong learning.		1 2 3 4 NA
19	The cost of implementing Information Technology in nursing education is too expensive for nursing.		1 2 3 4 NA

	1 - strongly agree 2 - agree	3 - disagree 4 - strongly disagree	NA - not applicable
20. The majority of students entering the nursing profession are computer literate.	1	2	3 4 NA
21. Nursing students who have access to Information Technology will always have access to current nursing knowledge.	1	2	3 4 NA
22. The use and knowledge of Information Technology by nursing students improves student's overall self-esteem.	1	2	3 4 NA
23. The use of Information Technology in nursing education improves graduates marketability for employment.	1	2	3 4 NA
24. The computer competency of nursing students should be evaluated clinically.	1	2	3 4 NA
25. Students graduating from the BN (Collaborative) Program in Newfoundland and Labrador should demonstrate competence in using patient information systems.	1	2	3 4 NA
26. Students graduating from the BN (Collaborative) Program in Newfoundland and Labrador should be competent with computer applications such as internet searches, email and word processing.	1	2	3 4 NA
27. The BN (Collaborative) Program in Newfoundland and Labrador should offer a required course on Information Technology.	1	2	3 4 NA
28. The need for implementation of Information Technology must be addressed in the BN(Collaborative ) program in Newfoundland and Labrador.	1	2	3 4 NA
29. The BN (Collaborative) Program in Newfoundland and Labrador should offer an elective course on Information Technology.	1	2	3 4 NA

Using the following scale please circle the number that best expresses the applicability of the following topics to your learning needs in the BN (Collaborative) Program in Newfoundland and Labrador.

1 - strongly agree

3 - disagree

NA - not applicable

2 - agree

4 - strongly disagree

- |                                  |   |   |   |   |    |
|----------------------------------|---|---|---|---|----|
| 1. Word processing               | 1 | 2 | 3 | 4 | NA |
| 2. Computer assisted instruction | 1 | 2 | 3 | 4 | NA |
| 3. Literature searches           | 1 | 2 | 3 | 4 | NA |
| 4. Internet resources            | 1 | 2 | 3 | 4 | NA |
| 5. Spreadsheets                  | 1 | 2 | 3 | 4 | NA |
| 6. Flowcharts                    | 1 | 2 | 3 | 4 | NA |
| 7. Decision support              | 1 | 2 | 3 | 4 | NA |
| 8. Electronic communications     | 1 | 2 | 3 | 4 | NA |
| 9. Expert decision making        | 1 | 2 | 3 | 4 | NA |
| 10. Hospital information systems | 1 | 2 | 3 | 4 | NA |
| 11. Statistical Package          | 1 | 2 | 3 | 4 | NA |

The remaining two questions are open-ended which require written responses. You may write on the back of the page if necessary.

1. In your opinion what are students most important needs related to the inclusion of Information Technology in the BN(Collaborative) Program?
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
2. Please write any comments that you feel are important related to the inclusion of Information Technology in the BN(Collaborative) Program.
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Thank you for your time and interest in completing this survey.



## **Appendix H**

### **Letter for Pilot Participants - Students**

September 16,1997

Dear,

Thank you for agreeing to participate in the piloting of this quantitative survey of students in the BN(Collaborative) Program. The answers you provide to the questions in the survey will be included in the study's collection of data and subsequent analysis. Guidelines are attached at the end of the survey to assist you in evaluating the survey.

When you complete the survey and feedback, please place both documents in the self-addressed envelope provided and return to the facilitator. If you have any questions please call me at 754-8932 or email kakenned@nurse.nf.ca.

Yours very truly,

Karen Kennedy

## **Appendix I**

### **Consent to Participate - Students**

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

**Consent To Participate In Research  
(Students)**

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**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:** Karen Kennedy 754 -8932

**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 demonstrate quantitatively the students', faculty's and administrations' needs for information technology in the BN(Collaborative) Program. 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:** A structured survey developed by the researcher will be used to gather data from students, faculty and administration. The use of a survey will offer complete anonymity. All information is confidential. The survey will consist of questions related to demographic data, computer use and views about information technology and its application to nursing. Analysis will involve descriptive correlational statistics and cross tabulation with chi - square statistics to compare students', faculty's and administrations' responses.

**Duration of Participant Involvement:** A contact person at each of the three sites will act as a facilitator in the distribution and collection of student surveys. Student surveys can be completed in approximately 30 minutes and returned to the

designated facilitator when completed. Participation is voluntary and participants have the right to withdraw from the study anytime or refuse to answer any of the questions.

**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 in Newfoundland and Labrador. The results of the research will be available to participants if desired.

**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 "A Two Part Study to Determine the Nature of and Need for Information Technology in The BN ( Collaborative ) Program in Newfoundland and Labrador. I understand that participation is entirely voluntary. The confidentiality of all information and the anonymity of all participants will be maintained in the written report.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Participant

Tear at dotted line and give the signed portion to the facilitator.

## **Appendix J**

### **Letters Requesting Permission to Access Faculty, Administration and Students**

3 Mableton Place  
St. John's, NF  
A1A 3Y6

Dear

I am conducting a research study for the thesis component as part of the fulfillment for a Masters Degree in Education from Memorial University of Newfoundland. The purpose of this quantitative study is to assess the need for information technology in the BN (Collaborative) Program. I have identified that the time and content allotted to information technology in undergraduate nursing school curricula may not adequately prepare graduate nurses with the technological knowledge and skill required to support nursing in the 21st century. The population for this study will include administration, faculty and students 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 quantitative study a structured questionnaire has been developed to address the following research question. What is the relationship between nursing student's need and faculty's and administration's need for information technology in the BN (Collaborative) Program in Newfoundland and Labrador? The use of a questionnaire will offer complete anonymity and all information is confidential. Participation is voluntary and participants may withdraw at anytime or refuse to answer any question if they so choose. Analysis will involve descriptive correlational statistics and cross tabulation with chi-square statistics to compare students', faculties' and administrations' responses. Date for data collection will be the fall of 1997.

A contact person at each of the three sites will act as a facilitator in the distribution and collection of student questionnaires. Student questionnaires can be completed in approximately 45 minutes. Questionnaires will be distributed to faculty by mail for completion within one month. Completed questionnaires will be returned to the researcher in a self addressed, postage paid envelope as provided by the researcher. Results of the research will be available if desired.

I am requesting your support in writing for the participation of administration, faculty and students at your site in the gathering of this data. Enclosed are two consent forms 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 - 8932 or email [kakenned@nurse.nf.ca](mailto:kakenned@nurse.nf.ca) or my thesis supervisor, Dr. George Hache at 737-7630 or email

ghache@plato.ucs.mun.ca or Dr Linda Phillips (Associate Dean of the Faculty of Education) at 737-8587 if you need any further information. Thank you for your consideration of this request.

Sincerely,

Karen Kennedy



### **Appendix K**

#### **Permission From Two Directors for Access to Faculty and Administration**

I. Guthrie Daley hereby give permission for faculty and administration within the BN ( Collaborative) Program at the Centre for Nursing Studies 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

July 8/97  
Date

\_\_\_\_\_  
Director

0

I, Linda A. Robbins (on behalf of the admin. team) hereby give permission for faculty and administration within the BN ( Collaborative ) Program at Western Regional School of Nursing to participate in "A Two Part Study to Determine the Nature of and 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

01 October 1977

Date \_\_\_\_\_

Director

## **Appendix L**

### **Permission From One Director for Access to Faculty and Administration**



# Memorial

University of Newfoundland

School of Nursing

July 14, 1997

Colleen House & Karen Kennedy  
50 Empire Avenue  
St. John's, NF  
A1C 3E6

Dear Colleen & Karen:

I am writing in response to your July 4<sup>th</sup> letter regarding your thesis research and my subsequent telephone conversation with Colleen. As I mentioned by phone, you do not need my permission to approach faculty/administration regarding your research and their consent is all you require. Personally, I would be willing to participate.

Enclosed is the signed form giving permission to you to approach second year students in the BN (Collaborative) Program. I understand that you will seek their consent and I would suggest that you contact Professor Marge Hackett, Associate Director, Undergraduate Programs, regarding a suitable time to make the approach.

Best wishes with your research.

Sincerely,

Marianne Lamb R.N., Ph.D.  
Director

Enclosure

c: Prof. Marge Hackett

SUPPORT



### **Appendix M**

#### **Letter to Faculty and Administration Requesting Participation in Study**

3 Mabledon Place  
St. John's, NF

August 15, 1997

Dear,

As partial fulfillment of the requirement for a Masters of Education, I am seeking full-time faculty who have worked in the BN( Collaborative) Program in the 1996-1997 academic year to participate in a research study. A consent form to participate is attached with details regarding the study. Data collection will begin in September 1997.

If you agree to participate, please sign and return the consent form to my mailbox in the envelope provided. If you have any questions or wish to discuss the study, please call me at 737-3693(w) or 754-8932 or email [kakenned@nurse.nf.ca](mailto:kakenned@nurse.nf.ca).

Sincerely,

Karen Kennedy, RN BN.

3 Mabledon Place  
St. John's, NF

August 15, 1997

Dear,

As partial fulfillment of the requirement for a Masters of Education, I am seeking full-time administration who have worked in the BN( Collaborative) Program in the 1996-1997 academic year to participate in a research study. A consent form to participate is attached with details regarding the study. Data collection will begin in September 1997.

If you agree to participate, please sign and return the consent form to my mailbox in the envelope provided. If you have any questions or wish to discuss the study, please call me at 737-3693(w) or 754-8932 or email [kakenned@nurse.nf.ca](mailto:kakenned@nurse.nf.ca).

Sincerely,

Karen Kennedy, RN BN.



## **Appendix N**

### **Letter to Thank Faculty and Administration for Participation**

To: Administration and Faculty,

Thank you for agreeing to participate in the research study, "A Two Part Study to Determine the Nature of and Need for Information Technology in the BN (Collaborative) Program in Newfoundland and Labrador".

This survey addresses your computer use and views about information technology and its application to nursing. I appreciate your time and effort in completing the questionnaire. When you complete the survey, please place it in the envelope provided and place it in my mailbox at the housemother's desk. I would appreciate your completed survey by Friday, October 24, 1997.

Looking forward to your valuable responses,

Karen Kennedy

## **Appendix O**

### **Director's Approval to Access Students**

I. Katherine Daley hereby give permission for second year students within the BN ( Collaborative) Program at the Centre for Nursing Studies 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 students will be maintained.

July 8/97  
Date

S

Director

U

I, Margaret Lamb hereby give permission for second year students 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 students will be maintained.

July 14/97  
Date

\_\_\_\_\_  
Director

I, Janet M. Robbins (on behalf of the admin team) hereby give permission for second year

students within the BN ( Collaborative) Program at Western Regional School of Nursing to participate in "A Two Part Study to Determine the Nature of and 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 students will be maintained.

01 October '97

Date \_\_\_\_\_

Director

**Appendix P**  
**Guidelines for Facilitators**

### **Guidelines For Facilitator**

1. Begin session by reading "Introduction of Research to Students"(attached) to the second year BN (Collaborative) Program students.
2. Note the total number of possible student participants at this time
3. Distribute "Consent To Participate In Research" form to students who are interested in participating. Allow time for students to read the consent form.
4. After you have collected the signed consents the survey can be given to participants to complete.
5. The survey will take approximately 25-30 minutes to complete The facilitator remains in the room to accept all the completed surveys.
6. Please place signed consent forms and completed surveys in the large envelope provided. Any unused consents and surveys should also be placed in this envelope

Thank you so much for agreeing to be a facilitator. If you have any questions please call me at 754-8932 or email [kakenned@nurse.nf.ca](mailto:kakenned@nurse.nf.ca)



## **Appendix Q**

### **Introduction of Research to Students**

### **Introduction of Research to Students**

- This research is being conducted by a nurse educator in the BN(Collaborative) Program as part of the thesis component required for a Master Degree in Education.
- The name of the study is "A Two Part Study to Determine the Nature of and Need for Information Technology in the BN(Collaborative) Program in Newfoundland and Labrador"
- The survey addresses your computer use and views about information technology and its application to nursing. It will take approximately 25-30 minutes to complete. Surveys are being conducted with students, faculty and administration at the three sites of the BN(Collaborative) Program in Newfoundland and Labrador
- Participation is voluntary and you may withdraw at anytime.
- Anonymity will be maintained.
- If you wish to participate please sign the consent and return the signed portion to the facilitator.
- The facilitator will then give you a survey to complete. Please return the completed survey to the facilitator before you leave.

## **Appendix R**

### **Faculty and Administration Responses to Open-Ended Statements**

## Faculty and Administration

### Question#1

"In your opinion what are students most important needs related to the inclusion of Information Technology in the BN (Collaborative) Program?

003 - Students should feel comfortable with the technology, understand the benefits for today and for the future - life-long learning. To be a professional today these skills are essential.

004 - Information access, CAL, word processing skills to aid progression through program, PIS.

005- Students need to be able to access the latest information on any topic, whether that be via literature search, internet etc. They need a good knowledge of HIS. Students need word processing skills in their daily student lives to meet course requirements - assignments, etc.

006 - PIS/ Literature and internet searches/ legal, ethical issues related ti IT, especially PIS.

007 - How to access information. How to evaluate the worth of information received via the internet.

008 - Word processing, HIS and literature searches.

009 - To provide an environment for learning using and applying IT that enhances their learning of required courses.

010 - Awareness of its usefulness and capabilities . Performing literature searches and accessing the internet.

012 - Orientation to computers and standard programs if needed, practice ( self-directed)

013 - Use of HIS, ability to conduct literature searches and word processing.

014 - Word processing, literature searches and internet.

016 - Students need to have access to and skills to use CAI, Internet and Email throughout the program.

017 - Knowledge of internet resources

018 - Professional - how client care documentation QI and workload index can be integrated.

019 - Need to feel comfortable with literature searches, email, internet searches. Upon completion of BN course students should feel competent in PIS.

020 - no comment

021 - word processing, use of internet, HIS, CAI and how to do literature searches.

## Faculty and Administration

### Question #2

In your opinion what are faculty's/ administration most important needs related to the inclusion of IT in the BN (Collaborative) Program?

003 - We need to have the latest information on so many topics, today texts, journals etc are outdated before or not available. In an age where speed, competency, professionalism etc are hallmarks of how we perform and how we are judged, these competencies are essential.

004 - Networked record system, skills for information access and creation of learning resources. Enhanced means of communication between partner sites.

005 - Word processing, literature searches, HIS, email, CAL, CAI, internet access.

006 - CAI and how to choose quality programs. Spreadsheets for grade computation. Professional presentations.

007 - How to access information. How to evaluate the worth of information accessed via the internet and Database/ spreadsheet for record keeping.

008 - Professional development

009 - Current software and access to experts for use in an effective way.

010 - CAL.

012 - Client/ patient info systems and health/ nursing informatics.

013 - Consistent integration of opportunities to develop needs identified in HIS, literature searches and word processing throughout the program.

014 - I assume that faculty given that they are Master's prepared know how to use IT for word processing, literature searches and use of statistical packages. Therefore the most important needs to be met are internet, distance education, CAI - designing courses content/ materials and HIS.

016 - CAI, internet and email.

017 - CAI

018 - Personal - word processing CAI internet and library searches

019 - Accessing information through internet searches  
Literature searches on medline, cinahl, health plan etc.  
Use of computer equipment in classes /labs.

020 - no comment

021 - Use of internet, literature searches, email, CAI statistical packages, HIS and spreadsheet and budgets

Faculty and Administration

Question #3

Please write any comments that you feel are important related to the inclusion of IT in the BN (Collaborative) program.

003 - Increase resources, financial and human to ensure these competencies are encouraged.

004 - A course developed as an elective for students would be great.

005 - It is first important to assess student learning needs/ level of competency related to IT because they are likely at different levels. Having an elective course available would be beneficial.

006 - IT should be a curriculum thread rather than a single course. Leveling of content and application and discussion related to clinical practice can be fostered.

007 - Must fully evaluate IT at school level to determine our future needs. If sufficient in terms of accessing information, word processing etc.....then may want to consider offering these in summer prior to entering program for those wishing to upgrade etc.

008 - no comment

9- -If students are not exposed or expected to use the technology they may lose the opportunity to observe the benefits that would be open to them.

010 - It should be threaded throughout the program on an ongoing basis.

012 - Ethical aspects of systems NB. Most info technology needs of students can be met through brief orientation taught by non-nursing faculty. Some inclusion of system in health care in nursing courses.

013 - no comment

014 - no comment

016 - I sense that this questionnaire doesn't reflect what progress has already been made with the current inclusion of IT in our BN collaborative program.

017 - Should be compulsory

018 - Sharing among sites of facilities and ideas.

019 - no comment

020 - no comment



021 - intergrate throughout the program after being given a solid base (orientation labs).  
Make it a natural part of the program.

## **Appendix S**

### **Student Responses to Open-Ended Statements**

## Questionnaire - Students

### Question #1

001 - They need proper instruction as to how the IT can be properly utilized.

002 - no comment

003 - Increase computer knowledge through general computer courses before attempting any advanced techniques or skills on the computer.

004 - no comment

005 - In my opinion information about hospital information systems, flowcharts and literature searches would be the most beneficial to nursing students.

006 - no comment

007 - The most important needs related to inclusion of IT is having the knowledge to use computers and various IT that is appropriate for nurses. Instruction .

008 - Students need to understand concepts of how to use computer programs R/T nursing. They need to be tested to make sure the learning process has took the right direction.

009 - In this course there is a lot of reports that have to be done and journal articles obtained. So information on how to use a computer is essential. Especially Literature searches.

010 - no comment

011 - Students should be computer literate and have some knowledge of what information technology is.

012 - no comment

013 - Students most important needs are being able to learn how to work with computers to do up flowcharts, find research articles and etc imp things nurses need to know for the nursing practice.

014 - Literature searched and resources for gaining info related to current nursing practice and needed for own research. Experience and practice with those computer softwares etc used in hospitals which will give students knowledge and practice before graduation and finding employment.

015 - Students need to be computer literate.

016 - Students in the BN program should be comfortable with how to use computers - Information technology as a course give us this comfort level especially for those not experienced with computers.

017 - Students need more help and teaching about the computer programs offered today.

018 - Word processing, hospital information systems and literature searches is what we use constantly.

019 - Nursing Assistant programs ie. About nutrition.. Internet and email, Hospital information systems.

020 - To understand and process the information and knowledge necessary to use a computer to its maximum potential.

021 - To have the necessary background in information technology so that one who graduates can go anywhere to work and have the basic understanding of how to use the computer.

022 - Hospital information systems (assuming that this is computerized charting).

023 - no comment

024 - I feel information systems and word processing are very important to the BN student. Many aspects of the program require the use of such programs.

025 - It is important for BN students to be computer literate for whatever the future holds in nursing.

026 - The inclusion of IT in the BN program will mean that if we do come across a job which involves the use of computers in health care we will be prepared.

027 - no comment

028 - Students need info on charting in computer systems as well as lab requests and reports and medications of patients in clinical area.

029 - To be familiar with some of the different things on the computer in relation to our work.

030 - To be competent in the use of IT

031 - Word processing and literature searches

032 - no comment

033 - Students must be aware of the different programs available on the computer to assist them with school work or personal development.

034 - Word processing, literature searches, internet resources are important for students.

035 - Learning how to do literature searches will help in finding info about and improving patient care.

036 - All I know is that it should be taken into consideration that not all BN students are computer literate. And that computers may need to be introduced from the basics for some students.

037 - They need to become more fam. with the computer and its programs.

038 - Students need knowledge on how to use word processing, spreadsheets, literature searches and internet resources. This will enable students to achieve a higher level of performance when writing papers, etc.

039 - no comment

040 - no comment

041 - no comment

042 - Students should be given the opportunity to develop a greater use and understanding of computers ie. With training sessions and availability of software packages.

043 - Word processing and basic computer skills to start with and then a gradual building of knowledge of more advanced skills which should be updated every so often as new software packages and programs become available.

044 - Students need to fully understand how to use a computer and be able to gain access to any information they need, especially for patient care.

045 - Proper skills and techniques for hospital info. Systems, literature searches, finding internet resources, communications (email) with colleagues and others

046 - I don't think it is necessary.

047 - Communications, literature searches and computer assisted instruction (ie. Case studies)

048 - Knowledge base if Info Technology implement access to research will be achievable. Right now research is taking a lot of time because articles are not available in libraries.

049 - no comment

050 - no comment

051 - Many students enter university with a very limited knowledge of the computer system. There needs to be a basis computer information course given in first year on the uses of the computer.

052 - Most important needs are knowing how to use the computer and different programs.

053 - More availability and access to information access to learning how to use and understand computers.

054 - Students need to learn how to use a computer. Many students haven't been exposed to computers before coming to nursing. Also as future healthcare workers, we need to become familiar with the systems that are used in the hospitals.

055 - no comment

056 - People need to stop being afraid of the computer. If we had a course on how to use the computer it would help up both professionally and academically.

057 - Basic computer training skills. My knowledge is very limited not having a chance to use a computer much. I feel that at this point very basic skills are needed much.

058 - I think there is a great need for the BN (Collaborative ) program student to be exposed to information technology as a whole because to be becoming a very big part of nurses careers.

059 - Information technology will improve students skills and prepare them for use of computers in the clinical setting.

060 - Courses on Information technology should be offered at the beginner's level.

061 - Literature searches (inc. internet) and the ability to determine reliable data from unreliable.

062 - The most important need is for literature searches, like when articles are found they should be available.

063 - How to use the internet and access information from it. How to use the various "Windows" programs and what they are used for.

064 - The students most important needs related to the inclusion of IT in the BN Program is basic knowledge and skills to be able to use a computer to their advantage.

065 - It is important for us to be shown how to use systems that will be needed to further success ie. patient info, internet, searches, etc.

066 - no comment

067 - To be competent in using computers.

068 - An information technology course should be a requirement of the program if we are expected to have experience in this area post graduation.

069 - Just a intro course to know how to turn on a computer, do email and a search.

070- To use the hospital systems correctly and efficiently to carry out the best possible nursing care.

071 - no comments

072 - How to use the hospital computer to document skills.

073 - Nursing students need to be more knowledgeable regarding the use of wordprocessing and hospital information systems. No clinical time and extremely little lab time (<3 hrs in 1st year) is dedicated to using computers for care plan purposes.

074 - no comment

075 - Understanding the current hospital databases and having the ability to suggest improvements on them.

076 - Wordprocessing skills for scholarly papers and hospital information systems.  
077 - no comment  
078 - no comment  
079 - Flowcharts add hospital - specific charting programs.  
080 - no comment  
081 - no comment  
082 - The flow chart system that some hospital use is by the computer.  
083 - No matter where you work you should know the basics of computers and what it does.  
084 - no comment  
085 - Knowledge on the use of computers  
086 - Availability of resources  
087 - no comment  
088 - Most important need is just to understand the basics of Info. Tech. that relate to what nurses will need to know in the future.  
089 - Programs that are like programs used in hospitals that we can practice on.  
090 - Using the internet for finding pertinent info., word processing for papers, literature searches for continuing professional development.  
091 - Word processing, internet use and hospital information system.  
092 - no comment  
093 - internet, word processing and patient information systems  
094 - Need to learn about hospital Information systems so we can document patient care precisely and correctly.  
095 - no comment  
096 - no comment  
097 - I think that we need to be able to record patients info and tests and we also need Info Tech. to keep up on new things that are occurring in the health care  
098 - Ability to function at an acceptable level when required to use a computer program as well as overall ability to use and search for information that is available electronically.  
099 - Unfortunately most students that I know are computer illiterate. More emphasis needs to be placed on computer education to move nurses into the 21st century.  
100 - Because we have to complete research papers and have to keep up to date with health care issues I think it is necessary.  
101 - Knowing how to use it, doing a course in it and being competent with it and also having computers available to use a lot.  
102 - Need to know more about Internet and word processing uses. Most students are only used to email and very little else.  
103 - Word processing for assignments and reports. Computer assisted instruction for labs and tutorials.  
104 - Competency is using the different technology information programs.  
105 - Every student should be given the opportunity to become computer literate.  
106 - To have access to modern and up to date information  
107 - Paper writing and literature searches  
108 - no comment

109 - Education is kept updated. And access to information is important through the computer.

110 - Most imp. need is instruction of the use of IT in the BN program. A lot of students are not very familiar with computers ,a beginners course should be implemented.

111 - Learning the appropriate skills to use computers.

112 - To allow for the more up to date information.

113 - no comment

114 - no comment

115 - no comment

116 -no comment

117 - The most important needs related to the inclusion of information technology in the BN program are being able to use the computer and knowing the basic of what you are doing.

118 - no comment

119 - Students most important needs are for literature searches when doing research papers. And instruction on how to use patient /hospital information systems.

120 - I feel that an elective or info session on Information Technology should be offered. Nursing care today is advancing to greater usage of computers and it is important that nursing students gain experience in info. Tech.

121 - I think that literature searches and other important information related to research is very important for the future nurses in the BN program. It is essential that we as students are provided with the most current and updated knowledge, to help and benefit our clients care.

122 - Literature searches

## Questionnaire - Students

### Question #2

001 - It would be an asset as we move toward the millenium when computers are going to be an even more integral part of our lives in both our private and professional lives. 002

- no comment

003 - Should be offered as an elective course in the BN program

004 - I feel as a nursing student starting a new program in this day and age that computers definitely should have been a part of our curriculum. I have very basic knowledge about computers and the various programs and would have loved to complete a course to broaden my knowledge. Now I feel that I will graduate in three years just as little knowledge as when I first came.

005 - I feel the inclusion of IT would be efficient for nurses, beneficial for information retrieval for all hospital staff and beneficial to patients by increasing time nurses have to spend with them.

006 - no comment

007 - no comment

008 - It should be a required course.

009 - If the Information Technology program is going to be included in the program it should be done in the first semester of the program. I knew how to use a computer but for someone who didn't it will definitely relieve a lot of stress if they knew how.

10- no comment

011 -no comment

012 - no comment

013 - no comment

014 - I believe that the majority of nursing students do not have basic computer skills necessary and required for employment, future educational experience. Info Tech can only be of future benefit for nursing students and should be mandatory in nursing training.

015 - The workforce is moving ahead if nurses as working professionals are to keep up to par they must keep pace with trends in the workforce.

016 - I strongly feel that there should be an elective Info Technology course in our program. If it was more mandatory I don't think that a lot of people would agree with it. But we do need this knowledge.

017 - Students need more teaching about computers before they are required to do any type of assignment or program.

018 - no comment

019 - It should be required by nursing schools because in years to come, Information Technology in hospitals might be the only way to chart, etc patient care.

020 - no comment

021 - With the way technology is headed we need to know about computers in order to do adequate care in the 21<sup>st</sup> century.

022 - I don't feel that it should be a distinct course abd it should just be incorporated into preexisting courses.

023 - no comment



- 024 - I feel all well rounded professionals should be knowledgeable in IT in order to remain competitive and knowledgeable in the world market.
- 025 - If information technology is introduced into the N program it must start off at a beginners level.
- 026 - Wide base of knowledge.
- 027 - no comment
- 028 - Information Technology is part of the current and future nursing profession. Literacy in IT will increase self confidence and knowledge in the clinical area.
- 029 - no comment
- 030 - no comment
- 031 - I think it is an excellent idea because many students do not know how to even turn the computer on.
- 032 - no comment
- 033 - no comment
- 034 - no comment
- 035 - Increasing technology will eventually have many things computerized therefore it is essential for nurses to have computer knowledge.
- 036 - no comment
- 037 - There are many people (nurses) who are working and afraid of the computer. I feel we should be fam. with its use . It is the FUTURE!
- 038 - no comment
- 039 - no comment
- 040 - no comment
- 041 - no comment
- 042 - It should have been done the first year of this program! (Fall 1996) as an elective course.
- 043 - Should be part of the curriculum to be taken early in the program. However, as of now a huge computer shortage at the Centre would render this task impossible.
- 044 - no comment.
- 045 - no comment
- 046 - I think that it is up to the student if he/she wants to learn but I don't think its necessary.
- 047 - Information technology will be an important part of the future. As future nurses for this province we will need to be prepared for the future.
- 048 - I believe thar adding this to BN program should be very worthwhile we need to better adapt to the next century and computer technology now seems to be the key to success and what society is aiming towards I believe that nurses play a major role in society.
- 049 - no comment
- 050 - I feel a course should be offered during the first semester of nursing school. Many people are not computer literate and would like to be, as it is often confusing when trying to write papers.
- 051 - I don't think there needs to be required course to be graded but there does need to be a course offered so that we can become computer literate in the use of the computer.
- 052 - no comment.

053 - Information Technology should not be the major importance in the BN program.

054 - I think its important to include Information technology in the BN program, but at the same time the importance of personalized care should also be equally stressed.

055 - no comment

056 - If an IT course was done in first year we would be more equipped to do research papers with computers. It would seem less scary entering a hospital that may use computers if we learned the basics of computers use.

057 - I feel Information Technology will greatly improve Health care and easily accessing pt. info. And allowing more time on patient care.

058 - I think the inclusion of Information technology in the BN (Collaborative) Program needs to take pride in the first year of the program and be stressed throughout the entire four years.

059 - Information technology will help students who are computer illiterate become comfortable with using the computer when doing research. This will help the students save time from doing their research manually. IT will also improve the skills of those who use the computer on a regular basis.

060 - no comment.

061 - The number of papers/ assignments as well as research articles necessary for this program must be taken into consideration. I feel this program is necessary.

062 - It should not be too time consuming due to lack of time to perform or complete various tasks now, and easy to learn for beginners.

063 - The BN program should include computer courses which could be optional since not everyone is computer literate and society is heading more towards the use of computers these days.

064 - IT in the BN program is the way to go because that is where the future is heading.

065 - These should be included in our program for there are people who do not know how to use a computer.

066 - no comment

067 - Should be a required course in the program.

068 - If it is going to be an important factor in future job opportunities it should be implemented into the program.

069 - Cost, time and basics not graded past 50%???....

070 - Extra course added to the workload. Will this mean another less important one will be dropped from the list of requirements?

071 - no comments

072 - I think that a computer course should be optional only if the student feels he/she needs it. some students are quite good at computers.

073 - Information technology is important in any program!For nurses, the benefits are having extra resources, knowledge to function at work ( many hospitals are using computer database now) and general opportunities for learning in life. The internet amazes me everyday!

074 - no comment

075 - no comment

076 - no comment

077 - no comment

078 - no comment

079 - no comment

080 - no comment

081 - no comment

082 - Technology is and will take away from the quality of nursing care. It is dehumanizing.

083 - I think that IT should be part of the program - maybe not a whole course, but it should be more focused.

084 - no comment

085 - no comment

086 - no comment

087 - no comment

088 - no comment

089 - no comment

090 - no comment

091 - no comment

092 - no comment

093 - Get some soon!

094 - I feel it is necessary to learn about information technology so we are prepared to use it in hospitals in the future.

095 - no comment

096 - no comment

097 - no comment

098 - no comment

099 - I would most certainly be at a disadvantage if I didn't know as much about computers as I do.

100 - no comment

101 - This Info Tech will be very beneficial, it's important to health care professionals. It will or should increase the knowledge of students, etc.

102 - Would like more computer labs and teaching on medical searches.

103 - IT should not be a prerequisite for the BN program. If it is going to be included by nurses it should be offered during the program. Students wishing to enter nursing should not be judged on their computer skills.

104 - no comment

105 - no comment

106 - no comment

107 - no comment

108 - no comment

109 - I completed a computer course while attending high school. However, when I came into nursing I had to relearn everything. I get a great satisfaction out of using a computer and would love to complete an information tech. course.

100 - I think overall that it is a good idea, it will help keep us up to date on the most important nursing strategies. As well as with the rest of Canada and the US

111 - There should be an elective course on Info Technology.

112 - Use of computers are vital in the 21<sup>st</sup> century and should be implemented into the BN program.

113 - no comment

114 - Opportunities to learn and advance current skills.

115 -no comment

116 - no comment

117 - no comment

118 - I feel that by including Information Tech. in the BN program, it will give nursing students time to provide the most appropriate care and to become computer literate.

119 - no comment

120 - no comment

121 - no comment

122 - no comment







